

THE RESOURCES OF THE EMPIRE SERIES

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THE RESOURCES OF THE EMPIRE SERIES

RUBBER, TEA & CACAO

WITH SPECIAL SECTIONS ON COFFEE,
SPICES AND TOBACCO

COMPILED AND EDITED BY
W. A. MACLAREN

WITH A FOREWORD
BY
H.R.H. THE PRINCE OF WALES, K.G.

AND GENERAL INTRODUCTIONS BY
THE RT. HON. SIR ERIC GEDDES, G.C.B.
(President of the Federation of British Industries)

AND
H. ERIC MILLER
(Vice-Chairman of the Rubber Growers' Association)



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FOREWORD

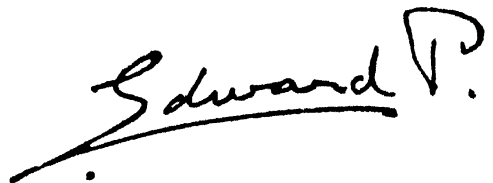
BY

H.R.H. THE PRINCE OF WALES, K.G.

No business man—especially should he contemplate an extension of activities—can afford to dispense with periodical stocktaking. The necessity for this applies equally to a country or empire, particularly when recovering from a devastating war that has resulted in heavy liabilities and dislocated the accustomed routine of trade and commerce. We are all proud of the British Empire, embracing more than a quarter of the world's land area and a similar proportion of its inhabitants, but very many of us fail to realize the infinite variety and vast extent of the Empire's natural products, which are capable of being made self-sufficing.

The volumes of this Series pass in review the material resources of the Empire, and constitute—as it were—an imperial stocktaking. They deal with food and raw materials of every kind, summarize the present condition of inter-imperial trade, and indicate where further developments are possible. . . .

At the present moment, when our great British Empire Exhibition is imminent, they should be of special interest both at home and overseas. It gives me great pleasure to recommend them to all those who have at heart the proper organization of the Empire's natural wealth.

A handwritten signature in black ink, reading "Edward VII." The signature is written in a cursive, flowing style with a long horizontal stroke underneath the name.

GENERAL INTRODUCTION

BY

THE RIGHT HON. SIR ERIC GEDDES, G.C.B.

IN undertaking the preparation of this Series the Federation of British Industries has, I am convinced, rendered a really practical service to business men throughout the Empire.

Hitherto there has been no standard work of reference giving the information which ought to be in the possession of business men all over the world regarding the resources of Great Britain and the other countries of the Empire in the materials of industry.

It is true that there are some excellent monographs describing in general terms the resources of isolated parts of the Empire, and a very few dealing comprehensively with individual products, but, apart altogether from the fact that the sum total of the information contained in existing publications falls hopelessly far short of what is requisite, such information as exists is hardly prepared in a form adapted to the requirements of the practical man who wants neither a bare table of statistics about the products essential to him in his business nor a mere general description of the extent of the resources of a given country in those products. On the contrary, the business man wants information, not only as to the available supplies of his raw materials, but as to the quality of the supplies produced in different parts of the world, as to the amount of the undeveloped resources, as to the transport facilities, as to the local conditions of labour, etc., and as to the chances of present supplies available for import in this country being absorbed in the near future by local demands. In other words, he wants particulars of all those factors which have to be taken into account in the ordinary course of business, and he wants those particulars arranged in an accessible form.

The aim of this Series has been to give this information in this form, and thus to provide not only for our own use, but for the use of traders all over the world a compendious Buyers' Guide to our Imperial resources. I venture to think that the present is a very appropriate time for this undertaking. It is not only that all our thoughts are being turned towards the idea of Empire Trade and Empire Development by the great Exhibition which is shortly to be opened and which will be the most impressive demonstration of our Imperial productiveness that the world has yet seen. The whole trend of economic circumstances is forcing us in the same direction.

The world war has disastrously affected the Continent of Europe as a market for the manufactured goods of Great Britain and the products of the British Dominions. Even foreign countries which were neutral in the great struggle have suffered in the same way, though in a less degree. Our trade with the

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Far East and South America has suffered serious diminution, and though more than five years have now elapsed since the cessation of hostilities, the resumption of normal conditions seems but little nearer. Moreover foreign tariffs are rising higher and higher against us all over the world. Meanwhile our own productive capacity has been substantially increased and our population has grown to such an extent that we have now two million more mouths to feed and a million more men to employ than we had in 1914. It seems clear, therefore, that we need some reorientation of our commercial policy, and the obvious direction for this seems to be the cultivation of our own inheritance. A study of the facts shows that there is good hope in such a policy. Britons in all parts of the world are bound together by ties of sentiment and custom which neither distance nor difference of conditions can seriously weaken. Not only has the tremendous investment of British money in our Overseas Dominions bound us with a golden chain, there are a thousand invisible impulses always strengthening the bond. Even in 1913 our trade with the Empire was about 25 per cent (Imports) and 36 per cent (Exports) of our total world trade. The following tables show this in more detail with a comparison with the figures for the latest twelve months available. From these it will be seen that our Imports from Imperial sources show a substantial advance over pre-War, the Export figures remaining about the same.

PERCENTAGES OF IMPORTS FROM VARIOUS SOURCES

Consigned from	Oct. 1922 to Sept. 1923.	Year 1913.
British-India	6.0	6.3
Self-governing Dominions	16.3	13.3
Other British Countries (except Hong-Kong).	5.3	5.3
Europe	33.2	40.4
United States	19.6	18.4
South and Central America	10.8	10.0
Other Countries.	8.8	6.3

PERCENTAGES OF EXPORTS (U.K. GOODS) TO VARIOUS DESTINATIONS

Consigned to	Oct. 1922 to Sept. 1923.	Year 1913.
British-India	12.2	13.4
Self-governing Dominions	18.0	17.5
Other British Countries (except Hong-Kong).	5.7	5.4
Europe	34.2	34.4
United States	8.0	5.6
South and Central America	8.8	10.6
Other Countries.	13.1	13.1

The following table shows the areas and populations of the British Territories on the various Continents :

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SUMMARY OF AREA AND POPULATION (1921-22)

	Area sq. miles.	Population.
Great Britain and Ireland	121,633	47,308,000
Europe	120	234,000
Asia	2,123,418	332,772,000
Africa	3,822,667	50,119,000
America	4,009,996	11,142,000
Australasia	3,278,917	7,795,000
	13,356,751	449,370,000

The following table shows the approximate purchases of British goods per head of population for the first three quarters of 1923 :

	£ per head.
India, British	0.2
Federated Malay States	0.5
Australia	7.8
New Zealand	12.3
Canada	2.3
Hong-Kong	7.7
Union of South Africa	2.1

The most striking features here are the huge acreage, small population, and large volume of purchase per head of Australasia and the relatively huge populations and small volume of purchases in the Eastern territories, with Canada and South Africa occupying an intermediate position. I will recur to this contrast later.

Finally a few figures may be given indicative of the percentage of various important world supplies either produced or available within the Empire :

	1915.	1921.
Copper (long tons)	100,000	46,000
Percentage of world production	10.2	8.5
Lead (long tons)	—	199,400
Percentage of world production	—	22.9
Tin Ore (long tons)	68,300	46,800
Percentage of world production	53.9	42.2
	1913.	1923.
Wool, including alpaca, etc. (lbs.)	5,414,067	14,077,339
Percentage of world production	74.6	77.1

It is clear, therefore, that there is an almost unlimited field for expansion of our Empire trade ; whilst in many lines this possibility of a self-supporting Empire should be realizable. On the side of Great Britain the requisite Productive power already exists. Overseas the position is somewhat different, and it seems clear that the requisite development of the purchasing power of the Overseas Dominions can only be produced by a gradual development of the resources of those Dominions, the surest way to which will be an increase in our own consumption of their products. There are two distinct problems, one for the tropical and one for the temperate and sub-tropical countries.

In the former any substantial increase in the white population is hardly to be expected, since the bulk of the work of the country must in such climates always be done by the native races. The purchasing power of these territories can therefore only be developed by the steady development of their material

resources. This, of course, means recourse to British capital, if Great Britain is to get the greatest advantage from the development and if our Imperial ideal is to be fulfilled. In our present economic condition this, of course, presents some difficulty, but if we can carry out this programme, there will follow a greater demand for British plant, machinery, shipping, rolling stock, etc., as well as a gradual increase in the consuming power of the natives.

In the temperate climates the quickest means to both our objectives lie in the speedy increase of the white populations. Nothing is more striking in the figures given above than the quantity of British goods purchased per head of these great peoples. But it is useless to attempt to stimulate emigration from this country to the Dominions unless there is a real demand for the services of the migrants when they arrive. Such a demand will only arise *pari passu* with the development of the resources of the country concerned.

The deduction to be drawn from the above considerations is obvious. How the required results are to be pursued is a more difficult question. This is not the place, nor am I the person, to embark on questions of political controversy. I will only point out that whatever method be adopted, accurate and comprehensive knowledge of the facts is absolutely essential. (All those who are engaged in business, either here or overseas, whether it be in finance, in production, in merchanting, in transport or in insurance, should be informed of what the different parts of our great Empire can produce, and the conditions under which production must take place and those under which the produce can be brought to market. There should be a general knowledge, too, of the amount of foreign competition, with which our products and materials have to contend.)

In all my experience, whether on the railways, in the turmoil of the Great War, in Government, or in commerce, I have been continually impressed with the vital importance of accurate and comprehensive statistical knowledge—and, I am afraid, too often impressed with the difficulty of getting it.

This Series is an endeavour to supply such information regarding our Imperial Resources. It cannot, unfortunately, be maintained that the results are in every case all that one could wish. However, this very inadequacy is perhaps the clearest justification for the Series. The fact that complete information cannot be given shows how necessary it is that all available information should be collected and made public. Only in this way can attention be called to what is wanting and the deficiencies made good. If the Series proves as successful as I hope it may and believe that it will, it should become a permanent institution, and it should be possible gradually to make good what is now wanting in future issues, so that eventually we may have in it a standard work of reference, which should be indispensable to all those interested or engaged in Imperial commerce or development, whether he be business man, student, or administrator.



March, 1924.

INTRODUCTORY REVIEW

BY

II. ERIC MILLER

"No previous age has had such large opportunities as the present for applying material resources in the elevation of human life. The forces of Nature are being turned back upon her to compel her to render ever larger returns to man's efforts in every branch of industry; any resistance that she may offer to the agriculturist and the miner being quickly reduced by the incessant development of fresh sources of rich supply, and by easy and rapid communication between distant places."—MARSHALL.

THE truth of this observation by one of the world's leading economists is singularly borne out by the history of the tropical products dealt with in the following pages by Mr. W. A. MacLaren. The British race has played a conspicuous part in the development of "fresh sources of rich supply," and in this respect has amply justified its stewardship over vast areas of the tropical world. The present generation is to a large extent unconscious of the debt it owes to its predecessors, and it may not be out of place in this preface to glance briefly over the past history of European connection with the tropical countries whence the various commodities are derived.

Spices were the first tropical products to play an important part in trade with Europe. From the early days of the Christian era until the end of the fifteenth century the traffic proceeded in stages from the Spice Islands via the Malay Peninsula and India to the Red Sea ports, whence the spices passed to various nations on the Mediterranean to be distributed in Western Europe at luxury prices.

Scarcity values created the belief that fabulous profits were obtainable if more direct communication could be established, and Prince Henry of Portugal stands out in the first half of the fifteenth century for his practical encouragement of exploration by sea. At that time vessels had to keep within sight of land, until the use of the compass gave them greater confidence. How slow progress was, however, is illustrated by the fact that although in 1412 Portuguese ships adventured along the coast of Barbary (Morocco) they did not extend their voyages to the Guinea Coast until 1442; and it was 1486 before Diaz rounded the Cape of Good Hope, opening the way to Vasco da Gama, who in 1497-98 brought the first European fleet to India. Almost simultaneously with this outstanding event Columbus was on his way westward to discover an alternative route to the Indies on Spanish account, resulting in the discovery of the West Indies and America.

The Portuguese and Spaniards combined conquest and the propagation of Christianity with their commercial ventures, which were conducted on State account, and Europe gained no advantage from the opening up of the sea routes, as the Portuguese wars in the Spice Islands and their plundering of the Persian Gulf traders actually diminished supplies until the Portuguese monopoly in the East Indies was broken a century later by the establishment of Dutch and English trading settlements there.

Instead of operating on State account the Dutch and English adopted the policy of granting monopoly rights to companies established on joint-stock principles, which companies had to combine with the actual operations of trade the responsibility of protecting their fleets and trading depots, virtually assuming the powers of Government. The history of the seventeenth and eighteenth centuries shows most active rivalry between the Dutch and English, under which the natives suffered considerable hardship; but when peace was established early in the nineteenth century trading on private account by individual merchant-firms gradually superseded the activities of the monopolistic East India Companies. Sir Stamford Raffles, one of the most enlightened officers of the East India Company, a true Empire builder and a great man, in spite of every discouragement from headquarters at Calcutta, was responsible for the establishment of Singapore in 1819 as the focal point in the Malayan Archipelago under the British flag, whither the trade of the numerous islands was soon attracted. It is largely owing to the sound foundations which he laid for the new settlement that European influence in those regions was turned into a real blessing for the native races there.

The production of the Spices, which first attracted Europeans to the Eastern tropics, has remained a native industry; but in importance to-day it is altogether eclipsed by the other commodities which have attracted European capital and European organisation. The present generation cannot be sufficiently thankful to the agricultural scientists and pioneer planters who had the vision and enterprise to make the start. Experiments were conducted in botanical gardens to see how shrubs and trees from one part of the tropics would thrive in other parts where climatic conditions appeared to be suitable. In this way coffee was extensively planted, so much so that Nature revolted at the surfeit of it and disease wiped out the bulk of the coffee bushes in the East Indies. The disaster which overtook the coffee planters put their strength of character to a severe test, but they were not found wanting, as they promptly turned their attention to tea and subsequently to rubber, whilst in Java the coffee industry has been revived by the introduction of a new variety from Africa.

In the tropics Nature is bountiful yet exacting, and the natives, left to themselves, cultivate only those crops which yield them a livelihood with the minimum of physical effort. Their wants are few, and individual ambition is almost non-existent. Whilst there are monuments evidencing Hindu domination in Java it is remarkable that the Chinese, a hardy race, with a culture and civilisation dating back many centuries, never assumed the responsibility of governing the more primitive peoples with whom they have, for centuries, had intercourse. The Chinese, coming from a densely populated

country where the struggle for existence is strenuous, have, however, unassumingly played a large part in the economic development of the Malayan Archipelago, where they are ubiquitous and have acquired an ascendancy in trading and in all forms of labour requiring physical strength, endurance, and mechanical skill. It has been left to the White race, who are physically not adapted for permanent residence in the tropics, to organise large scale industries there, to impress the natives with the advantages of regular work for regular pay, to improve communications and housing, to introduce sanitation and medical comforts, and generally to raise the standard of living of the local populations whose activities they direct. The last century has been a century of peace and of progress in the East Indian Islands, and progress has been greatest where European influence was most strongly established.

The importance of scientific work on the problems of tropical agriculture cannot be overemphasized, and every encouragement should be given to the augmentation of it. The history of Coffee in the East Indies is an example of the ruin which disease can bring about, and constant watchfulness is needed to keep in check the pests and diseases to which the other cultures are prone. The Industries under European control recognise the importance of this, and expend large sums annually on scientific work; but the natives are heedless of the danger of neglect, and the Government are obliged to exercise compulsion in order to secure the most elementary precautions being taken. Mr. Maclaren rightly strikes a note of particular warning in regard to Cacao in West Africa, where it is almost entirely a native culture, as being particularly liable to the ravages of disease.

In conclusion, I would like to draw attention to an important problem which is almost inherent to perennial agricultural industries such as rubber, tea, cacao, coffee, coco-nuts, cinchona, etc. In these a period of several years must elapse between the planting out of the seedling trees or bushes and their reaching the stage when crops can be harvested. Whoever undertakes to lay out such permanent estates must therefore take a long risk, depending on what the position of the particular commodity is to be several years later; and whereas a superabundance of an annual crop is rapidly adjustable by planting out a smaller acreage in the ensuing season, the permanent cultures, once planted, have to be constantly tended at considerable expense unless their value is to be seriously diminished. In the case of rubber, tea, coffee, cacao, and cinchona there has at one stage or another of the Industry's development been a crisis, due to the fact that production had outstripped consumption. The casual remedy for such a state of affairs would be to allow dire distress to eliminate a sufficient proportion of producers until an equilibrium between supply and demand was again established. In view of the fact, however, that the needs of the world are steadily increasing with the growth of population, the result of undue depression in any industry is usually, once the aforementioned equilibrium has been reached, a swing of the pendulum towards inflated prices, until the increasing profits again attract further production. These violent movements are welcomed by the speculator, but are disconcerting in the extreme to the two most legitimately interested parties, viz. producer and consumer.

The recent crisis in the Rubber-producing Industry has been met by legislative regulation of exports, pivoting on a price just sufficient to afford producers a moderate return on their invested capital and low enough to give every encouragement to extending the consumption of the commodity. In this way it is confidently believed that a temporary condition of over-supply will be tided over with the minimum of economic disturbance, and the result of these measures may well prove to be a wider appreciation of the fact that the ruthless struggle for the survival of the fittest can be advantageously replaced by more humanitarian principles.

H. ERIC MILLER.

EDITOR'S FOREWORD

REMARKS ON THE SCOPE OF THE ENQUIRY AND SOME CONCLUSIONS

THE RUBBER, TEA, CACAO, ETC., INDUSTRIES AS IMPERIAL ASSETS

THE purpose of this introductory chapter is to convey some generalised ideas bearing on the exploitation and utilisation to the maximum benefit of the Empire of the products with which the book as a whole is concerned. It will not have escaped attention that the object of this series on the Resources of the British Empire is to cater for the needs of the business man—(be he manufacturer, merchant, broker, financier, or investor) who wishes to learn those facts regarding each product and industry that have a practical value for him to the exclusion of the deeper technical aspects—and the Imperialist (included, it is to be hoped, in the former) who seeks to assess the various resources of the Empire at their proper value, actual and potential, from a desire to tackle from its foundations a problem which is much to the front in the councils of the Empire, namely: How best to utilise Empire assets for Imperial ends.

The author or compiler of a publication meant to be sold as one in a series having such aims may take his readers' interest for granted, but not even a superficial acquaintance on their part with the subjects under discussion is to be assumed. Hence the prefatory remarks which follow and the general method of the book.

1. THE SCALE OF TROPICAL AGRICULTURAL PRODUCTION IN THE BRITISH EMPIRE

The present volume deals, as will be seen, with a group of exclusively agricultural industries, and with two exceptions (tobacco and tea, of both of which there is a considerable cultivation in temperate climes) they are all tropical agricultural industries. The popular idea of the typical agriculturalist is probably ineradicable. It is that he is a slow, unenterprising, unimaginative individual whose leading traits are an addiction to grumbling and to beer—be tolerated, nevertheless, inasmuch as he does a large part of the world's work and provides the main part of its foodstuffs and the raw material for its clothing. How far astray the first part of this estimate is with regard to agriculturalists in temperate zones it is for others to say; as applying to the tropical agriculturalists in the great industries of rubber, tea, etc., it is entirely unfounded. The speed of development in these industries has been such as to change within a few years the whole face of the country over extensive territories which were previously nothing but unpopulated jungle. Labour is recruited and brought,

it may be, a distance of several thousand miles. Hill-sides are terraced, roads laid out, drains cut, streams bridged, coolie lines, bungalows, and "factories" built, jungle cut down, burnt off and planted, and a whole busy life created in about the time it takes the suburban resident to set his new house and small garden in order. The scale on which tropical planting enterprise in the rubber and tea industries is conducted is large, especially in relation to agricultural industries in temperate lands. It is quite usual for a single property in one ownership to occupy several square miles of planted land and the labour employed may number one thousand coolies or more. It will easily be understood that the estate superintendent at the head of such a force has the means of carrying out an extensive programme in a short time, a power that is rarely at the command of the agriculturalist unless backed by outside capital.

The case of the British Rubber Planting Industry is, of course, an outstanding instance of recent expansion in tropical agriculture. It may for a moment be put side by side with the expansion of the motor-car and tyre industry which covers exactly the same period. Probably there has been no more progressive manufacturing industry as regards increase in output than motor-car and tyre manufacturing. But what do we find? The agricultural industry has far outdistanced in the production of rubber the requirements of its principal customers, the tyre manufacturers, and their customers, the motor-car manufacturers. Incidentally, by progressing at the greater rate it has created for itself a very difficult position.

2. IMPERIAL ASPECTS: SURPLUS PRODUCTION OVER IMPERIAL REQUIREMENTS FOR CONSUMPTION

We are enjoined to think "Imperially," and in this connection the industries under examination offer a wide field of problems and afford some grounds for satisfaction. It is becoming generally recognised that under the system of high tariffs now prevailing the future of British Manufacturing Industry depends on the development of the Resources of the Empire with British capital. Since British manufactured goods are debarred from entering many foreign countries to whom we have to make payments of interest, or from whom we must (under present circumstances) buy certain essential materials, it has become a question of establishing a system of triangular trade whereby raw materials for shipment to foreign countries (and for our own needs) are bought with exports of British manufactured goods to the countries of origin. Any Imperial industry furnishing a surplus of raw material over and above the Empire's requirements is thus a source of strength to the Empire and to manufacturing industries at home. In fact it may be of more importance as a counter than as an actual source of raw material for Imperial Manufacturing Industries.

This conception certainly takes a place in the present view of Imperial economic policy and necessities. The two raw materials dealt with in this volume that are produced in surplus are rubber and cacao, and particular interest, therefore, attaches to the diagrams appearing in the respective sections

and showing the average unit value of these commodities compared with the "Statist" index of wholesale commodity values. Since these surpluses are the counters with which we buy the surplus production of other countries it must naturally arouse concern when they lose their purchasing (or interest-paying) power. The extent to which this has occurred may be judged from the following example :—

Rubber Production of the British Empire, 1922, at 1913 (lowest pre-War) values	91,700,000
" " " " " " at values ruling in 1922	23,490,000
Reduction	68,210,000
Plus 50 per cent of £91,700,000	45,850,000
Loss in exchange value (one year)	£114,060,000

The reduction in the value of rubber as compared with 1913 does not represent the whole of the loss in exchange value against other commodities because the cost of wholesale commodities in 1922 was 50 per cent over the pre-War level.

Theoretically the British (home) manufacturer of rubber goods, shared¹ with his overseas' competitors the saving on the cost of rubber: that is to say he saved £11 to £11,500,000 (on 1913 prices plus 50 per cent), or £7,000,000 (on 1913 prices without alteration for parity), while the overseas rubber manufacturing trade saved £103,000,000 on British rubber from the British Empire and £60,000,000 on rubber from other sources (partly produced by British companies operating in foreign colonies). Over £100,000,000 of purchasing power, with the trade it would have brought, was lost to the Empire and its manufacturers. The above calculation may be thought a little far-fetched, but to whatever extent it is discounted it still illustrates a problem, and the international exchange aspect of the rubber question was adduced by the Rt. Hon. Mr. Winston Churchill (Colonial Secretary in the last Coalition Government) as having influenced him greatly when he endorsed the Report of the Colonial Office Committee which recommended the compulsory regulation of rubber exports—a measure which is dealt with elsewhere.

Apart from its value as an article of Imperial production of which there is a surplus in the Empire, rubber is the most important of the products under review, and this for two reasons: (1) It is, in the war-time phrase, an "Essential Commodity," being as indispensable in the peaceful arts as in warfare, and (2) It is the basis of a manufacturing industry. An assured supply of raw rubber is no small asset to the Empire; but rubber is of little value in any industrial application till manufactured, and should the Empire be ever again required to fight for its existence the absence of adequate rubber manufacturing facilities would be serious. A very high state of technical efficiency has been reached by the British Rubber Manufacturing Industry, but it has, unfortunately, suffered very severely from foreign competition from countries having depre-

¹ Unfortunately the condition of the industry was such as to prevent home users from taking full advantage of the low prices.

ciated currency, or assured home markets, which make their competition particularly formidable abroad. In consequence the great development which has occurred in recent years in the rubber manufacturing industry of America, for instance, has not been paralleled in Great Britain.

3. SPECIAL ECONOMIC ASPECTS

There are one or two general economic aspects—more or less peculiar to the products under consideration—to which it seems desirable to call attention. One fact that must be insisted upon is that from the economic standpoint tree cultivation is a very different matter from the cultivation of crops that are planted annually. All the main products covered in this volume are yielded by trees that require four, five, six or more years to reach the bearing stage. This, of course, means that there is a long waiting period before the investment returns any profit. But it means more than this. The area under a crop planted annually is determined by the profitable or unprofitable nature of the crop of the previous season or seasons; if an increased demand springs up it can, generally speaking, be provided for within the period of one year; land which has been under an annual crop and has been abandoned is of no further consequence until replanted. On the other hand, a tree crop must be planted five years or more before a crop can be sold and demand must be anticipated; a large permanent labour force is employed which must be kept together and given work on cultivation and collecting produce; land planted with tree crops when abandoned for any reason may be again brought into production without replanting. The cultivator of a crop planted annually may adopt rotation of crops; the tree-grower perforce uses the same soil till it becomes "sick."

All these features have their effect on supply and demand, and there are other differences¹ too numerous to mention that make it dangerous to apply any conclusions drawn from a yearly crop to a tree crop. The economic aspect of tree cultivation differs again from that of the exploitation of the wild trees in forest areas. The native rubber collector will not make a journey to the forest and labour to collect rubber unless the price offered is good. The rubber plantation owner, precisely because he has sunk money in his plantation, must work it in bad times as in good. The result may be seen in the present prices of balata and gutta-percha compared with that of rubber. These products (obtained from wild forest trees by tapping in a rough and ready fashion) have maintained and increased their price, while that of rubber (which was formerly the higher) has fallen.

The full discussion of these economic aspects would require a volume by itself. It may, however, be laid down that in a general way the supply of

¹ Tea and rubber are more or less all the year round crops, though in some important districts there are wintering periods; cacao also gives some yield during a great part of the year; as does coffee at low elevations in the tropics. This has its bearing on the employment of labour and on the flow of supply. It also puts the cultivations under consideration in a different class from fruit-growing in temperate climates.

agricultural commodities, on the production of which a fresh start has to be made every year, tends to be adjusted to demand annually; whereas in the case of rubber, tea, coffee, and cacao such adjustment tends to take place by quinquennial periods. The reference is to tendency only. Obviously the farmer settled on his land, having a small choice of annual crops, is not wholly a free agent.

The *tendency* being as stated, the fact is, of course, clear that, while one unprofitable year is bad enough, five unprofitable years are ruinous. Hence, in the case of tree-cultivation products, a great deal must always depend on wise control of production.

The law of supply and demand as generally (and mistakenly) understood may be allowed with comparative safety to wreak its full effects for a short period because one year of high prices or low prices, low production or high production, is an eventuality provided for by the reserve funds of producer and consumer alike. A five-year cycle is another matter, and the doctrine of *laissez-aller* cannot even be contemplated in this connection.

The escape from the difficulty is thought by some to lie in attaining a capacity for production in excess of the immediate needs of consumption. It is then a case of delivering to the requirements of consumption and maintaining the price at a moderate figure which will not check the increase of consumption while affording the necessary encouragement to extension of planting enterprise as consumption is seen to increase. The problem of dealing with the reserve producing capacity is an involved one. The capacity may simply not be utilised. This is not wasteful as it seems, in connection with rubber at any rate, for the best storage for rubber is in the tree itself, which, moreover, benefits in health and future yielding power through the tax on its productive power being reduced. Other methods of coping with the problem are: Production for storage (in which case a cost of production is incurred and financial facilities are necessary; elimination of low qualities, etc. •

4. CONSERVATION, OR EXTENSION ?

In regard to two of the principal commodities—rubber and cacao—here dealt with, the *immediate* need is for conservation of the Imperial asset represented by the industries rather than an extension of the area at present under the products. There is room for moderate extension in several of the other planting industries, but generally speaking British capital and enterprise at the moment would be better directed to the cultivation of the fibre crops (Vol. III of this series). This is not to say that excellent opportunities for investment are not to be found in the shares of existing tea and rubber companies and in the coffee industry while, provided the preferential duty is at home stabilised, there is plenty of room for extension of tobacco cultivation within the Empire.

Conservation includes the maintenance of an industry on a remunerative basis to save it from degenerating in quality of production and yield per acre, and the undertaking and prosecution of the disease and pest preventive measures which are so necessary in all plantation industries. The general

decline in yield per acre on the older plantations of tea, coffee, cacao, etc., is a serious feature and can only be counteracted by more care in cultivation, greater knowledge of plant requirements, and the introduction of higher yielding and more disease-resistant types through seed selection, etc. Disease and pests have in the past taken a heavy toll of the planting industries. Some instances are given in the "Final Survey of the Cacao Industry" (p. 230), and the complete destruction of the Ceylon coffee industry as well as of large coffee areas in India by such means (p. 210) is a well-known case. At present the pepper growing industry in Sarawak is suffering severely from the attacks of *Cephaleuros Mycoidea*.

Happily the control of disease and pests is now a well-recognised part of the duties of the Government Agricultural Services in all the Colonies, and of estate managers, and the situation (except here and there) gives little cause for anxiety though much for unceasing vigilance.

It is in this connection that mention may appropriately be made of a very encouraging development—the foundation of the Imperial College of Tropical Agriculture (St. Augustine, Trinidad). The College, which has now entered upon its second year, carries on its work in several directions. As its prospectus states, its object is to afford general instruction in tropical agriculture, to give opportunities of thorough training in the science and practice of the subject to those intending to become tropical planters, investigators, or experts in different branches of agricultural science or technology, and at the same time to provide facilities for the study of tropical agricultural subjects on the part of graduates from other Universities and Colleges who desire to acquire knowledge of these subjects in tropical surroundings. To this end the College offers a three-years' course in general agriculture, leading to a diploma; it affords facilities for study of particular subjects on the part of post-graduate students, and it is prepared to afford facilities for research.

5. THE NEED FOR A CO-ORDINATED COLONIAL AGRICULTURAL POLICY

Among the considerations which naturally occur to any student of agricultural production as it is carried on in our Tropical Colonies, is the desirability of a more fully developed and co-ordinated Colonial agricultural policy. The fault in many of the Colonies is that cultivation has been too much restricted to one product. The Gold Coast, with its huge and ever-increasing cacao industry, and British Malaya, with its even more important rubber industry, are cases in point. The danger of becoming a one-product country should be apparent. Firstly, there is the menace of attack by disease or pests—always greater where there are large concentrations of acreage under one cultivation. Secondly, there is the risk of a long-continued slump in the particular article of produce paralysing the economic life of the whole country. Thirdly, and particularly formidable in conjunction with the second eventuality, is the unsound position which arises when the natives have given up growing their own food supplies, as is largely the case to-day in the Gold Coast Colony and

in Malaya, in order to devote attention wholly to the cultivation of one crop for export. A lesson may be taken from some of the foreign one-product (or almost one-product) export countries, Brazil (coffee) and Ecuador (cacao) for instance; in each of these countries the national finances have become deeply involved in the fortunes of the respective industries. Brazil formerly had a second industry (rubber) of almost equal importance to coffee, but since it has sunk to minor importance owing to the competition and cheaper cost of production of the Eastern plantations, dependence on coffee has been greater, and to provide for the maintenance of exchange and payment of taxes the country has had to take over the burden and responsibility of financing the crop.

A strong case certainly exists for the extension of more deliberate directive effort on the part of Colonial Governments and their agricultural departments towards guiding the native farmer in the choice of his cultivations. European planters have made their own mistakes and were themselves principally to blame for them. The native producer, however, has not the advantage of being in close touch with the markets; he is in profound ignorance of the statistical situation of the commodity he is producing and of the probable future demand. His is the agricultural viewpoint pure and simple. The path of least resistance is always to go on planting the crop which experience has shown grows well in the country without reference to any other consideration.

All those who have the welfare and advancement of the native races at heart will agree that the first thing is to get them firmly settled on the land and inducted into habits of industry. Only the worst possible results can follow when such industry proves unremunerative, as it is bound to be if this line of least resistance is always followed.

Some very good work (for an account of which see Vol. III of this series) has recently been done in connection with the encouragement of cotton-growing by African natives, and it is obvious that the method on which to proceed is to direct native energy to the cultivation of those products of which there is a shortage within the Empire.

The setting on foot of a native co-operative movement in India, Burma, Ceylon and Malaya, is another development of which much may be hoped. An account of the commencement of the movement in Malaya and its bearing on the native rubber industry will be found on p. 72.

6. ACKNOWLEDGMENTS

Acknowledgments must be made to the Crown Agents for the Colonies, Colonial Office, and Overseas Department of the Board of Trade, for access to statistics not otherwise easily obtainable; to the Governments of India and Ceylon for permission to use matter appearing in their respective Commercial Handbooks, to Mr. Schroder, of Nottingham, for information on Empire-grown tobacco, and to numerous Trade Associations, Dominion and Colonial representatives in this country, and others, for assistance kindly given. The preparation of the matter has been somewhat hastily done in a period of under four months, but within limitations imposed by lack of time, no trouble has

been spared to make the information as representative as possible of the state of the various industries at the date of writing. "Estimates" are but rarely given, and only when actual figures (obtained in many cases by averages taken over the whole or a great portion of an industry) could not be got; they are, moreover, indicated as such wherever they appear. Particular attention has been paid to the provision of data on the financial results of working of each industry, since it is on these that the maintenance and extension of supply depends.

W. A. M.

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RUBBER, TEA & CACAO

SECTION I

THE RAW RUBBER INDUSTRY OF THE BRITISH EMPIRE

CHAPTER I

GENERAL ECONOMIC SURVEY, INCLUDING CONSOLIDATED STATEMENT OF SUPPLY AND CONSUMPTION

[Revised for general data to January, 1924; statistics complete to December 31st, 1922.]

1. The Foundation of the British Rubber Planting Industry: Wild Rubber. *Hevea brasiliensis*. Wickham's Exploit, 1876.—2. The Influx of Capital into the Industry: Early Years of the Industry. Early Profits of the British Rubber Planting Industry. Development of the Industry.—3. Methods of Cultivation and Preparation of Rubber: Cultivation. Tapping Operations. Yield and Life of the Para Rubber Tree. Preparation of Plantation Rubber. "Ribbed Smoked Sheet." "First Latex Crêpe."—4. The Organisation of the British Rubber Planting Industry: Primary Organisation. The Tendency towards Amalgamation. The Rubber Growers' Association. Other Organisations of the Industry.—5. The Introduction of Compulsory Regulation of Rubber Exports: The History of the Rubber Slump. Appointment of a Colonial Office Committee. Compulsory Regulation brought into effect. Explanation of the Stevenson Scheme. Administration of the Scheme.—6. The Statistics of Rubber Production and Consumption in the Empire and in the World: Imports by Consuming Countries.—7. Organisation of the London Rubber Market: The F.O.B. Contract. The Delivery Contract. The C.I.F. Contract. The Spot Contract. The Godown Contract. Procedure of Weighing and Sampling. Standard Quality Committee. Intrinsic Quality. Identification Marks on Rubber. The Rubber Exchange. The Rubber Settlement House. Brokerage. "Set-Off." Arbitration. Off-Grades.

BRITISH pre-eminence in the production of raw rubber is the growth of a comparatively short period. The progress and fortunes of the Industry as a whole can be followed by means of the charts illustrating this chapter, while the general table of rubber exports on page 50 shows the shipments from each of the Colonies in the most important and eventful years.

In the first year of this century the world's production of rubber was just under 55,000 tons, all of which, except a small matter of about five tons, was wild rubber collected from virgin forest areas in South and Central America, Africa, etc. By 1905 the world's output had reached 62,145 tons, of which 4172 tons were produced in the British Empire (principally West African rubber) and 145 tons were plantation rubber. The next five years brought the world's

rubber output to 77,000 tons in 1910, of which the British Empire contributed 11,217 tons, including 8406 tons of plantation and 2811 tons of wild rubber, still representing under 14 per cent of the total output. By 1913 (the pre-War year), however, a great change had come over the scene. The British Empire supplied 48,187 tons out of the world's total of 115,000 tons, and of this quantity 46,919 tons consisted of plantation rubber. To come to 1922, the latest date for which full statistics are available, the Empire contributed 272,000 tons out of a world supply of 402,000 tons, viz. 68 per cent and 100 per cent of this was plantation rubber. Again, of the total world supply 377,000 tons was plantation and 25,000 tons wild rubber.

The British Empire has thus moved rapidly forward from a position of comparative unimportance as a supplier of a variety of inferior wild rubbers to one of commanding importance as the principal supplier of rubber to the world's markets.

The history of the development of the British Raw Rubber Industry is also the history of the Rubber Planting Industry, an enterprise founded, and mainly directed by British hands and brains, and financed with British capital.

1. THE FOUNDATION OF THE BRITISH RUBBER PLANTING INDUSTRY

WILD RUBBER.—Since attention is shortly to be directed almost entirely to the problems connected with the supply of plantation Para rubber, a short account must be inserted here of the pre-existing source of supply, now of such diminished importance—particularly in the Empire—viz. wild rubber. The number of trees and plants, including climbing vines, which are capable of yielding rubber is prodigious, and most of them have at some time or another been exploited commercially. It is quite impossible to name them all or a tithe of them. In Africa *Funtumia elastica* supplied for many years quantities of rubber which came on the market under various names, while numerous kinds of *Landolphia* vines were exploited, and very often destroyed in the process, by the natives. In the East Indies *Ficus elastica* was the source of Rambong rubber—another article which came on the market under many different names. This tree was also planted fairly extensively by the Dutch in Java and Sumatra, but with little success. In Central America and Peru, especially in the latter country, *Castilloa elastica* furnished large supplies of excellent rubber known as Caucho or Peruvian Bull. From Bahia, and Pernambuco in Brazil, came quantities of badly prepared rubber collected from various kinds of Manihot (*M. Glaziovii*, *Jequie Manicoba*, etc.)—trees which also came to be planted, principally in East Africa.

Finally, by far the largest and best supply of wild rubber came from the regions of Brazil watered by the Amazon River, and was produced by the trees known as *Hevea brasiliensis*, or the Para Rubber Tree.

HEVEA BRASILIENSIS.—It is this tree which has been so extensively planted in British Malaya, Ceylon, India, Borneo, etc., as well as in the Dutch East Indies and French Cochin China, and is now responsible for fully 96 per cent of the world's output of rubber. As regards suitability for cultivation, it has

amply justified expectations, whereas *Castilloa*, *Manihot*, *Funtumia*, and *Ficus* plantations have all turned out unsuccessfully from the point of view of yield and financial return on exploitation. It is a matter for gratification that while the Germans in the Cameroons, New Guinea and elsewhere were coquetting with *Funtumia*, *Ceara*, and *Castilloa*, and the Americans in Mexico and Central America with *Castilloa* plantations—in which, according to the U.S. Department of Agriculture, a sum of \$30,000,000 (£6,000,000) was totally lost—the British planting industry concentrated with practical unanimity on *Hevea* (Para rubber).

WICKHAM'S EXPLOIT OF 1876.—The seeds from which the whole Para Rubber Planting Industry has sprung were obtained from Brazil in 1876 by something not unlike a smuggling exploit; the perpetrator, Sir (then Mr.) H. A. Wickham, has, however, since earned the gratitude of his country and of the Industry and world at large—marked in the first case by the bestowal of a knighthood, in the second case by the award of the Gold Medal of the Rubber Growers' Association, together with suitable monetary recognition, and in the third by a growing appreciation of the fact that, without the additional supplies of rubber which have come forward from plantations, the modern development in transport, and in many other directions, would not have been practicable.

Those responsible for sending the present Sir Henry Wickham, who was then planting near Santarem, on his mission were the late Marquis of Salisbury (then Secretary of State for India) and Sir Joseph Hooker (Director of Kew Gardens). After a previous attempt had failed—the seeds were obtained, but the plants died—he received an open commission from the Kew authorities to obtain another consignment of seeds and bring them to England. The commission was a welcome one. But it was another thing to carry it out successfully. He was puzzling as to how the work was to be accomplished when he and the few European planters in the locality were surprised by news of the arrival in the Amazon of a fully-equipped ocean liner—the *Amazonas*, the first of the new Inman Line of steamships trading direct between Liverpool and the Alto-Amazon. By a lucky chance, just at the right season, this large steamer was left stranded by her supercargoes without freight for the return voyage.

This was Mr. Wickham's opportunity. Boldly chartering the steamer on behalf of the Government of India, he arranged with her commander to meet him at the junction of the Tapajos and Amazon rivers. Starting for the forests in the highlands between the Tapajos and Madeira rivers, where the finest of the true Para rubber trees were to be found, taking with him as many Tapuyo Indians as he could get together on short notice, he daily ranged the forests, and packed on their backs in Indian pannier-baskets as heavy loads of seed as they could carry. With great care some 70,000 seeds were collected and packed in native baskets, brought to the steamer and slung fore and aft in the empty forehold. It was necessary to call at Para, where, thanks to the good offices of the British Consul, the steamer was allowed to proceed without delay. It had been feared that the Brazilian authorities would prohibit the export of the seeds. Favoured by fine weather, the captain was able to leave the hatchways open throughout the voyage, so that the seeds were preserved in the best condition. Wickham landed at Havre, and hastened to Kew, saw Sir Joseph

Hooker, and arranged for a night goods train to meet the *Amazonas* on arrival at Liverpool docks on June 14th, 1876.

When it is mentioned that only 4 per cent of the 70,000 seeds germinated when planted, it will be recognised how fortunate was the concatenation of circumstances which enabled Mr. Wickham to collect his seeds and transport them to the steamer, to find a vessel at his disposal, and to preserve the seeds in good condition between Brazil and Kew.

From the Brazilian consignment of seeds about 2800 plants were reared at Kew. It was then decided to utilise the Botanic Gardens at Peradeniya in Ceylon, as a depot for the plants. Of the plants reared at Kew, a consignment consisting of 1919 plants was sent to Ceylon in thirty-eight Wardian cases, in charge of a gardener, and 90 per cent reached Ceylon in excellent condition. Some were subsequently forwarded to Malaya, and from the seedbearers raised in Ceylon and Malaya the present plantations are descended.

2. THE INFLUX OF CAPITAL INTO THE INDUSTRY

EARLY YEARS OF THE INDUSTRY.—As may be gathered from the figures of annual production already quoted, it was long before the cultivation was commenced on a big scale. The stimulus imparted by the introduction of the motor-car, the rising price of rubber, and lessened attractiveness of other cultivations (for example, tea and coffee, owing to over-production) were necessary to draw capital and enterprise to the Industry. From 1905 to 1910, however, progress was rapid, and the high dividends declared by the earlier companies caused the rush to invest in rubber which led to the Rubber Boom, now of lugubrious memory to many. By that time the price of plantation rubber had mounted to 7s. 1d. (average) for 1909, 8s. 9d. for 1910, and 5s. 5½d. for 1911. In three recent years it has been, 10½d. (1921), 9½d. (1922), and 1s. 3d. (1923).

EARLY PROFITS OF THE BRITISH RUBBER PLANTING INDUSTRY.—It may be instructive to glance at the showing of that period with its comparatively small outputs as we now judge quantities. In 1909 the output from all the British plantation rubber countries was 4318 tons, in 1910 it was 8406, and in 1911 it was 14,456 tons (1922, as already noted, 272,500 tons). Making a substantial allowance for "off grades" selling below the average price of each year, and allowing 1s. 9d. per lb. for cost of production (1909-11) the figures shown on page 33 are arrived at.

This indicates a profit of nearly £12,000,000 during three years on a bearing acreage of perhaps 40,000 acres at the start, and 150,000 (at most) at the end. It is, therefore, no wonder that large dividends were declared: but a point to notice is that the Industry at large never shared in the profits earned during the boom at all; they went to the wild rubber producers and to the few fortunate first-comers amongst plantation companies—40-150,000 (bearing) acres compared with over 2,000,000 acres (more or less) now in bearing in the Empire.

There is a certain sober interest in contemplating these facts and, as this volume is one of a series primarily intended for business-men, no apology need be made for presenting them.

The payment of these big dividends by the pioneer companies—they were in the main, by the way, instantly repaid to the companies in return for the issue of new shares, often at a premium, to enable extensions to be carried out—led to the formation of more and more companies, the shares of which were readily subscribed mainly in Great Britain.

DEVELOPMENT OF THE INDUSTRY.—The great period of capital influx into the industry ceased with the collapse of the Rubber Boom through overinflation, and a period of consolidation and the carrying out of planting programmes followed. During the War there were official Treasury precautions against the export of capital and even necessary upkeep of unproductive acreage could only be financed with difficulty, while restricted shipping facilities created an unsatisfactory position in other respects. Companies whose properties came into bearing during this period were mulcted in Excess Profits Duty regardless of the fact that rubber was at a lower price than it had been before. Many years of waiting intervene between the investment of money in rubber planting and the first dividends returned. In spite of these handicaps, however, the

EARLY PROFITS OF THE BRITISH RUBBER PLANTING INDUSTRY

	Output of Plantation Rubber from the British Empire. tons	Selling Value of Output. £	Net Profits. £	Approximate area in bearing acres	Approximate profit per acre in bearing. ² £ s.
1909	4,318	3,000,000	2,150,000	40,000	53 15
1910	8,406	7,000,000	5,350,000	95,000	56 6
1911	14,456	7,200,000	4,350,000	150,000	29 0

1921	201,900 ³	19,800,000 ⁴	2,812,000 ⁵ (loss)	1,750,000	

acreage under rubber steadily increased until the end of 1920, the great over-production in that year proving a most effective check to development.

Much of the planting during the War was done by natives and (in Malaya, etc.) by Chinese, and the increasing productivity of such estates—mainly small holdings—practically nullified the effect of the various programmes of voluntary restriction of output introduced by the European planters. It may be mentioned, by the way, that the voluntary restriction practised during 1918, and again during 1920–21, and to some extent during 1921–22, was aimed not only, and perhaps not even primarily, at maintaining the price of the commodity, but

¹ The figures of areas in bearing are based on the best contemporary records, but must be accepted as approximations only: they are probably on the high side.

² Even higher profits were realised by some companies, which sold at or near the highest prices during the years in question instead of at or near the average.

³ This like the other figures in the column represents exports from the producing countries.

⁴ Selling value for 1921, including off-grades, is calculated at Rickenson's averages; this is probably putting it too high, but it is desirable not to incur the charge of exaggerating the extent and effect of the slump.

⁵ Cost of production is taken at 1s. per lb. The actual figure for *old* estates in Malaya was 11·8d., and young estates, properties in Borneo, Uganda, etc., incurred higher charges.

also at conserving the supply in future years through preserving the health of the tree and allowing an adequate period of bark renewal. These are technical points that will be dealt with later. They are not considerations that were likely to appeal to the ignorant native intent only on getting a maximum yield for the moment, without thought of future years, but that they failed to commend themselves to the intelligent Dutch planting community in Java and Sumatra—as well served by scientific advisers as our own—has always been a puzzle to the British Industry.

This slight sketch of the history of the British Rubber Planting Industry is a necessary introduction to the accounts (in the geographical survey) of its importance, output, competitive position *vis-à-vis* of other countries, etc., in the various Colonies and Protectorates of the Empire and in India—which are concerned mainly with the existing state of matters. Before dealing more fully with the situation that had grown up in 1922, and which caused the Colonial Office to take the unusual step of intervening to bring about a regulation of supplies in accordance with the demand, some notice may be taken of such matters as the methods of growing, obtaining, and preparing rubber, and the organisation of the Industry.

3. METHODS OF CULTIVATION AND PREPARATION OF RUBBER

The Para Rubber Tree (*Hevea brasiliensis*) is usually grown about 100 to the acre¹; it commences to yield in its fifth or sixth year according to elevation, climate, and country. A moist and equable climate without high winds and with a well-distributed rainfall of not less than 80 inches and an average temperature of 70–80° Fah. are necessary for good results, while it flourishes up to just under 2000 feet elevation in Ceylon and most tropical countries if other conditions are suitable. Generally speaking the lower the elevation the better the yield, provided that marshes and swamps are avoided. The higher the elevation the greater is the influence exerted by strong winds, particularly if they prevail during the dry seasons. In its native habitat on the banks of the Amazon and its tributaries the ground on which the tree stands is often under water for several months in the year; this is a condition that even from the sole point of view of inaccessibility for tapping is far from advantageous, and all estates in the East are now well drained, and when on hill-sides they are often terraced to prevent soil wash. Rainfall is one of the most important factors influencing yield, the highest yield invariably following after the period of greatest rainfall. The most rapid growth, other things being equal, is made on rich alluvial soils, but the tree flourishes sufficiently well on a great variety of poorer soils.

CULTIVATION.—Great stress is laid by practical planters on the necessity of proper cultivation of the soil. An estate which has been properly and continuously cultivated from the time it was planted up invariably yields more latex per acre and per tree than another similar estate which has not been

¹ This applies to estates under European management. Even on such estates it has been the custom to plant much more closely and thin out eventually to about this figure.

cultivated. The disturbance of the soil by tillage—always providing that cultivation is not carried on in such a way as unduly to damage the root systems of the trees or lead to soil wash—results in the aeration of the soil, in a greater freedom of movement of soil water, and in the admission of air to the roots.

TAPPING OPERATIONS.—When the tree has attained a girth of 20 inches at 3 feet from the ground, generally in its fifth or sixth year, it is tapped by means of a paring tool which takes off a thin shaving of bark, thus opening the latex vessels; the latex or “milk” then appears and runs down the cut into a cup placed to receive it. Care has to be exercised to avoid wounding the cambium which is responsible for the renewal of the cortical tissue in which the latex tubes arrive later by a process of perforation and decomposition of the cells. Daily tapping was once almost universal, and during certain years when the price of rubber had mounted very high every effort was made to get the maximum yield of latex by increasing the number of cuts; thus arose the spiral, half-spiral, and herring-bone systems of tapping.

At first the tree responded to the additional stimulus, but each additional cut yielded a smaller additional amount of latex, until it began to be recognised that tapping was being overdone. It was found that the renewed bark was not thick enough to tap upon when the time came round to do so, and whereas at one time estates were tapping over the whole of their available bark in three or four years, it is now recognised that eight or nine years is not too long a period for renewal, while some estates have adopted systems allowing ten and twelve years to elapse before there is a necessity for tapping on renewed bark. On the great majority of well-managed British estates, therefore, tapping methods have become more conservative than they were ever before, e.g. tapping on alternate days, or at less frequent intervals; or a spell of tapping, and then a rest lasting over several months is given. Another reason for this change has been the appearance of “brown bast,” a physiological condition of the tree indicating that an undue strain has been put on it.

With the new methods which result from greater knowledge gained of the tree, yields per tree and per acre are likely to be smaller than those in the past; but, on the other hand, the tree is kept in health and is more likely to continue a yielder, the supply of the future being safeguarded. The reckless bark expenditure by native cultivators, and, unfortunately, by some European planters who are still working on a system of five years' bark renewal, leads the conservative planters to believe that their outputs will be smaller when outputs perhaps will be much more well worth marketing. It is no secret to-day that many Dutch planters are going “full out” without regard to the future welfare of their plantations.

YIELD AND LIFE OF THE PARA RUBBER TREE.—There are so many disturbing factors to be taken into account that it is difficult to make any general statement regarding the “normal” yield and life of the Para rubber tree in cultivation. There can be few if any estates which have been continuously tapped on the same system and continuously cultivated on exactly the same lines for a long period of years. However, it may be said that after reaching the tapping stage at its fourth, fifth, sixth, or sometimes even seventh year (the first representing

exceptionally favourable, and the last exceptionally unfavourable circumstances) the yield is small, but increases year by year. Actual yields per acre taken as averages over a large number of estates, and including both young and old trees, are given in the geographical sections (for Malaya, Ceylon, etc.) which follow.

The so-called "Duncan Scale" of yields is as follows :—

Under 5 years	Nil
Between 5 and 6 years	120 lb. per acre
" 6 and 7 "	180 lb. " "
" 7 and 8 "	240 lb. " "
8 years and over	320 lb. " "

Another authority gives : Fifth year, 75 lb. ; sixth, 110 lb. ; seventh, 175 lb. ; eighth, 200 lb. ; ninth, 250 lb. ; tenth, 300 lb. ; eleventh, 375 lb., and twelfth, 400 lb.

On a large number of estates a tendency has been shown for the yield to flat out or positively decline after the twelfth year, but how far this has been due to soil wash, overtapping (with consequent exhaustion and deficient bark), or other reasons has never been positively determined. Some authorities are of the opinion that under favourable circumstances a gradual increase in yield can be counted on till the twenty-fifth or even thirtieth year. As regards the probable value of Para rubber trees after the thirtieth year opinions are again at variance, and there is not yet a sufficient accumulation of evidence to justify any definite pronouncement. It is anticipated by some that after the thirtieth year the bark with continuous tapping will have become exceedingly thin, and that thereafter it will be increasingly difficult to obtain any profitable yield, while by the thirty-fifth year it is very doubtful (in the opinion of those planting authorities) whether any tree that has been continuously tapped since coming into bearing will show a tappable thickness of bark. Cases are known of estates in Malaya where rubber trees not much more than twenty years old have already been felled, but probably the decision to do so was influenced by a variety of reasons. The inadvisability of replanting on "Hevea-sick" ground is, of course, not open to doubt. In contrast with the estimates of a thirty year or thirty-five year profitable life there are other authorities, including the present chairman of the Rubber Growers' Association, who are confident that the expectation may be extended to fifty, sixty, seventy or more years. Both sides to the controversy are entitled to their views until the facts are definitely determined, but it must be pointed out that *Hevea* is cultivated under a system which aims at obtaining a maximum yield, and the trees on plantations are therefore not on all fours with those growing wild in the forests of Brazil, which are known to attain very venerable ages. The strain on the tree occasioned by repeated tappings makes it more susceptible to disease and may tell on its life.

THE PREPARATION OF PLANTATION RUBBER.—The next step after latex has collected in the cups is for the coolies to empty them into pails and convey these to the estate factory. The latex is then brought to a standard dilution,

is sieved, and bulked in tanks with other latex received from the estate. An anti-coagulant may be added if it has to wait some time before treatment in the coagulating tanks, into which it is next flowed. There the strength of the bulked latex is tested by means of an instrument called the "metrolac," which shows the quantity of dry rubber it contains per gallon; the quantity in the tank being known, it is an easy matter to calculate the result which should be forthcoming. A small quantity of acetic acid is added to bring about coagulation. The coagulum, as obtained from the shallow coagulating tanks, may be made into either sheet or crêpe. Wooden partitions having been inserted in the tanks before coagulation, the strips are of a size suitable for handling.

"RIBBED SMOKED SHEET."—No heavy machinery is required for making sheets; in fact there is no need to employ power-driven machinery at all, but as on most estates there is plant for producing crêpe, the power is utilised where available. The machine used is like an ordinary wringer, and through it the coagulum, after being prepared by hand-rolling, is passed to give it a smooth surface. The rubber is next passed between the rollers of a marking machine which are grooved to give it the ribbed surface familiar to buyers of "ribbed smoked sheet"; at the same time the mark of the estate is impressed. After having been cut to uniform length to suit the racks in the smokehouse, the rubber is allowed to hang and dry, often on bamboo poles in the open air, before being removed to the smokehouse. Smokehouses are of several types, which it is not necessary to describe; suffice it to say that the period of smoking may be from ten days or a fortnight to five or six days, according to the system employed. An average is perhaps ten days. The colour of smoked sheet comes from the chemical constituent of the woods burned to obtain smoke. "Ribbed smoked sheet" is one of the standard grades of the London market.

"FIRST LATEX CRÊPE."—The preparation of crêpe rubber differs from that of sheet in requiring heavy and expensive machinery. The lumps from the coagulating tanks are taken to the crêpeing machines, which are power-driven. Three types of machine are now in general use. The first type has deeply grooved rollers where the rubber passes through two or three times. It is then taken to less deeply grooved rollers, where it passes through a few times, and is finally finished off in a set of smooth rolling machines. Altogether up to twelve machinings are sometimes given. In the Federated Malay States normal air-drying is almost invariably employed; that is to say, the sheets of crêpe are hung up in a large drying-shed with good ventilation, and without extraneous heat. In Ceylon artificial driers of some type are frequently employed, either hot-air driers or vacuum driers, drying being completed in a couple of hours or less. For artificial drying it is necessary to mill the crêpe thinner than for air drying. When withdrawn from the chamber the dry rubber is sticky on the surface, and is then taken to the machines, where several layers are milled together to form the well-known blanket crêpe. This procedure has remained unaltered for the last ten or twelve years. Air-dried crêpe cannot be readily milled to give a thick blanket crêpe, as it is too hard, and the thin layers of crêpe will not adhere. Consequently hot-air driers have been introduced into the Federated Malay States recently for the purpose of making thick crêpe, which

is now in much demand for shoe soles. The pale colour of standard crêpe is obtained by adding a solution of sodium bisulphite to the latex. This has to be done with great care as an excess is harmful and a deficiency causes a streaky or mottled appearance.

Originally several lower grades of crêpe were made besides "first latex crêpe," one from cup washings and skimmings, one from "tree scrap," one from "bark scrap," and one from "earth scrap" (the latex which has dribbled to the ground). The point, however, has not escaped notice that the cost of collecting and preparing these was higher than that of the standard grades, while they fetched a much lower price, and their manufacture has been largely discontinued. The present tendency is to make one grade (if any at all) out of the lump, washings and skimmings and picked tree scrap all mixed together. The methods described, of course, apply in practice on European owned and managed estates. On native estates the procedure is much cruder and will be referred to in connection with native estates in British Malaya (p. 72). It is an interesting point showing the attention given to ensure a clean product, that there is a general rule on all estates prohibiting coolies bringing in latex from the fields from crossing the threshold of the factory.

No doubt much of the care expended in the preparation of rubber for the market is to improve appearance as well as to secure what ought to be the only object, uniformity of product. Quality is independent of appearance, but as things are rubber is principally sold on appearance, and so long as this is the case the planter will make for his market. Good uniform appearance does, however, indicate care in preparation; and in aiming at the one mark the other has been more nearly attained than would have been the case with no standard in view.

4. THE ORGANISATION OF THE BRITISH RUBBER PLANTING INDUSTRY

PRIMARY ORGANISATION.—In the early days of the Rubber Planting Industry the organisation of the estates was influenced by the type of organisation obtaining at the time in the older cultures of tea, coffee, etc. The usual system for the larger groups was a European staff, consisting of a general manager or superintendent, his assistants, the factory engineer, the storeman, and possibly the estate doctor. The properties were put under control of an agency in the East, which inspected the holdings, through the visiting agent, and controlled the book-keeping.

The great majority of rubber estates planted on "European principles" in the British Empire are now owned by joint-stock companies, having their headquarters in London, Edinburgh, Glasgow, Manchester, Colombo, Singapore, and Shanghai, while others are owned in Japan and Australia, and there are important estates financed from the Continent.

The proportion of British capital to the whole is preponderating. Rubber manufacturers, while almost the last-comers into the field, now own some large estates.

As a rule the companies are organised in groups, a single firm being respon-

sible for the secretarial and agency duties of each group, which may comprise from half a dozen to twenty, thirty or more companies. This system, which obviously makes for centralisation and the efficient handling of problems common to rubber companies as a whole, arose naturally out of the circumstances under which the companies were originally formed. It was in the main the leading merchant firms trading with the East Indies who were responsible for the financing of the first companies, and they gradually either acquired or planted up estates, or inspected and bought land for planting, and transferred the estates or land to limited companies which they formed and floated, retaining a considerable interest and investing some of their own capital. As the merchant firms had their own agencies in the East, and were, furthermore, in close touch through their home offices with the produce markets in Mincing Lane, they would usually secure the agency agreements both for London and the East, would agree, for the sake of convenience, to undertake the secretarial duties, and at the same time have one or more members of the firm on the Board of the new company.

Here it may be said that the Rubber Planting Industry was very fortunate in the influences presiding over its birth. Though there was, as has been seen, a Rubber Boom, its course was extraordinarily free from the financial scandal usually attending on such a phenomenon. Of fraudulent companies there were none, and of "hopeless propositions" from the start very few indeed. Seldom during a period of capital influx into an industry can a cleaner record have been achieved. These results can be put down to the fact that the leading part was taken by sterling old-established East India merchant firms, having a knowledge of the planting countries and the conditions prevailing therein, and to the further fact that there was already in existence in the East a large planting community with experience acquired in tea and coffee, whose services could be, and were, utilised for reporting on, planting, and visiting the properties to be acquired. Moreover, there was in England a considerable public who had already been investors in tea, and who became investors in rubber with rather more critical acumen than others not versed in some knowledge of tropical planting would have displayed. The retired planting element was also not inconsiderable, and it is rare indeed to find the Board of a rubber company on which does not sit one (and generally more than one) director who has personal knowledge of planting.

• • In times of stress financial assistance to weak companies has often been afforded by the agency firm, and in other ways the system has abundantly justified itself. A very close check on expenditure has always been maintained, and the Industry has very little in the way of extravagance in the past of which to accuse itself.

Alongside the agency firms there are the Investment Trusts to consider. There are several of these investment companies, and they have undoubtedly played an important part in the development of the Industry, without, it must be confessed, much benefit to their shareholders. This has not been their fault, but their misfortune. During a period of financial setback an investment company is faced both with depreciation in the value of its holdings and loss

of dividends from the shares in which it has invested. Formed as they were to acquire a judicious mixture of shares in the young rubber companies, and thus to "spread the risk" for their own shareholders, to undertake flotations and the underwriting of new companies, and to plant up young rubber estates and sell them at maturity, the investment trusts have naturally borne the brunt of the unforeseen continuance of low prices.

THE TENDENCY TOWARDS AMALGAMATION.—Ever since the Industry commenced on a large scale there has been a tendency to amalgamate small neighbouring estates; this first became evident during the time of the boom, when it was easy for a company owning an estate which had reached bearing to offer very tempting terms to the owners of neighbouring properties which had not reached that stage and at the same time provide for its own future. The low capitalisations per acre attained by some well-known companies are, as often as not, not due to exceptionally low cost of bringing land into bearing, but are attributable to a system by which shares were issued at a high premium to enable such purchases to be carried out, the issue being either to the vendors in exchange for the new property, or to the shareholders in the purchasing company for cash to be applied to the same purpose.

More recently, under pressure of circumstances of another kind, the amalgamation of neighbouring properties has been continued with a view to attaining what in each management's view is the ideal size of an estate for economical working. In the case of some recent acquisitions of smaller properties by larger neighbouring estates, it has been noticeable how low the purchase prices have been—from £25 to £45 per planted acre—figures which are certainly below the cost of bringing an estate to the same stage of development. Such acquisitions, of course, reduce the average capitalisation per acre of the purchasing company independently of any economy realised on working. Apart from such instances, it seems certain that amalgamation presents advantages up to a certain point; where it ceases to do so is difficult to say, and it must in all cases depend on a great variety of circumstances, including the lie of the land, etc.

In all combinations there is a limit beyond which amalgamation becomes ineffective for the purpose of promoting economy in the working of the organisation. A logical assumption would be to have the factory the unit in determining the size of the organisation. A big central factory for several large divisions has serious drawbacks. The theory is that it should bring about economies to have one big central plant to work the rubber for several large divisions. The fact is that such economical working is not always realised. If each division is given its own factory, presuming the division is a large enough unit, then an economical working would be to have a well-paid manager on each division, who superintends the general organisation of his division and of the factory output. One factory engineer handles the factories on two different divisions. This dispenses with the services of a general manager for the several divisions.

The problem is too beset with difficulties to have one common and obvious solution. One fact that does emerge with distinctness is that amalgamation does not, as has been too often assumed, provide a universal solution to the question of ways and means of obtaining more economical working. As will

be seen below, the average size of estates in one company's proprietorship is very high in the Rubber Industry—much higher than in any other kind of cultivation, whether tropical or otherwise, that can be called to mind—and it is at least doubtful whether (purely from the point of view of economical working) further amalgamations could be justified. That they will continue so long as mature or semi-mature rubber acreage is obtainable below the cost of planting and bringing it to that stage is, however, understandable, if only for the purpose of reducing the average capitalisation per acre of the stronger companies.

THE RUBBER GROWERS' ASSOCIATION.—Apart from the degree of natural organisation, as it may be termed, arising from the above-mentioned concentration in financial groups, the Industry has one very strong association of planting companies, The Rubber Growers' Association (2, 3, and 4 Idol Lane, London, E.C.). Evidence of the activities of this body are to be found in every direction, and it has initiated almost every development of advantage to the Industry since its formation in 1907. When its last annual report was issued the membership stood at 917, consisting of 534 companies and 383 individuals. Statistics are available relating to the property owned and capital invested by 515 of the company members. These show a total issued capital of £78,115,750 and a planted area under rubber of 1,202,018 acres, the total area owned amounting to 2,561,842 acres. The average area of rubber estates owned by company members is, therefore, shown to be about 4970 acres, while the average planted area is approximately 2300 acres, the average issued capital £151,681 and the average issued capital per planted acre £62 9s. These figures give an idea of the scale upon which the Rubber Industry is conducted. The particulars are as follows :—

STATISTICS OF RUBBER COMPANY MEMBERS OF THE RUBBER GROWERS' ASSOCIATION (INC.)

No.	Companies operating in.	Authorised Capital. £	Issued Capital. £	Acreage owned.	Acreage planted or inter-planted rubber.
288	Malaya	46,701,364	38,256,594	968,042	664,871
98	Ceylon	19,091,079	15,834,772	388,730	145,096
42	Sumatra	17,566,900	11,540,579	535,145	192,133
38	Java	8,019,500	6,717,398	373,309	102,514
2	Dutch Misc. . . .	265,300	229,543	33,294	4,930
15	India	2,244,000	2,103,027	73,548	36,898
8	Burma	840,150	626,328	18,259	13,486
21	Borneo	3,366,940	2,668,373	158,971	38,018
3	Other countries . .	156,850	139,136	12,544	4,072
515		98,252,083	78,115,750	2,561,842	1,202,018
		2,812,441	1,477,773		
6	Trust Co.'s . . .				
		101,064,524	79,593,523		

NOTE :—This statement does not include debentures or reserves (or the proceeds of issues of shares made above par) invested in the estates. Particulars of the acreage of nine private estates are, however, included in the figures. There are also thirteen company members not directly owning rubber estates and not included in the table.

It is impossible within the space of a short review touching on many subjects to give more than a faint idea of the range of the Association's work. Working in this country there are twelve permanent committees and (at the present moment) five temporary committees, all charged with the supervision of some specific activity, such as Rubber Research, Freights, Medical Research, Labour, Propaganda, etc. There are also local committees in South India and Malaya, and an executive committee in Ceylon in connection with the Ceylon Rubber Research Scheme (p. 79), which is partially supported by the Association. In Malaya the Association maintains a Scientific Department of its own (inaugurated in 1910) with four scientific officers and a fully equipped laboratory, etc., on Petaling Estate, working in conjunction with the Association's Consulting Chemist in London (Dr. H. P. Stevens). Research work in connection with various rubber-tree diseases, and experimental work with tapping systems, coagulants, lectures and demonstrations in planting centres are among the duties of this department.

During 1917 the Association was instrumental in setting on foot negotiations with the Colonial Office, which, if successful, will link up all the existing research schemes in the British Colonies and Dependencies, and will allow of research proper being carried out side by side with work on those pressing questions, such as disease, that call for immediate relief. Considerable progress has been made in this direction and the completion of the scheme cannot be long delayed (p. 70).

In recent years the Association, while carrying on its other work as before, has had prominently before it the question of coping with the problem of overproduction. This it has done in two ways, by the formation and carrying through of proposals for the voluntary restriction of output by its members, and by the creation of a Propaganda Department, the purpose of which is to bring about an increase in the use of rubber. The Propaganda Department administers a fund raised by a voluntary levy¹ of 1s. od. per acre spread over two years on the estates in the membership of the Association, but its work and the action of the Association on restriction are parts of the larger question of maintaining some reasonable correspondence between rubber supply and demand and are considered later on (see pp. 44, etc.); there will also be recurring mention of the work of the Rubber Growers' Association, so thoroughly do its activities permeate the whole structure of the Rubber Industry.

OTHER ORGANISATIONS OF THE INDUSTRY.—There are strong local associations of rubber estate proprietors and planters in Malaya and Ceylon, which receive mention in their appropriate sections and complete the organisation on the producing side of the Industry, while the Government Agricultural Departments in the various British rubber-growing countries also contribute to the sum total of the effort expended on the cultivation and preparation of rubber. The Imperial College of Science and Technology (South Kensington)—towards the expenses of which the Rubber Growers' Association recently contributed the sum of £30,000—provides training for the budding rubber

¹ Contributions to this fund have also been made by the Rubber Trade Association of London and the F.M.S. Government.

technologists, on whom the Industry relies for future progress in the direction of disease control, evolution of better yielding and more highly resistant types of *Hevea*, etc. Research work on the qualities of plantation rubber with a view to their betterment is carried on at the Imperial Institute in connection with the Ceylon Rubber Research Scheme (p. 79), and the facilities at the Institute for examining and reporting on rubber samples, furnishing information, etc., were at the service of the Rubber Industry before there was any other institution competent to give advice. The probability is that the functions of the Institute with regard to rubber will shortly become more important still.

Matters pertaining to the handling and sale of raw rubber are in the province of the Rubber Trade Association of London, between which and the Rubber Growers' Association there is close co-operation on various matters touching the interests of both. Its functions are dealt with on p. 54 on marketing. Corresponding associations are found in Singapore and Colombo.

Mention must also be made of the India-Rubber Manufacturers' Association, with headquarters at Manchester, and the British Rubber Tyre Manufacturers' Association, which represent consuming interests, and the important British Rubber and Tyre Manufacturers' Research Association, formed under the Government Research Scheme. The last-named derives its revenue from contributions by a small body of leading rubber goods manufacturers, plus the Government grant, and maintains a fully equipped laboratory at Croydon, principally for the study of rubber manufacturing problems, into which, however, matters turning on the quality and preparation of raw rubber necessarily enter to a large extent; there is, therefore, a measure of interworking between this body and the Ceylon Rubber Research Scheme to which allusion has previously been made.

Finally, the Rubber Industry as a whole (including the producing, manufacturing, and marketing sections) meets on a common ground at the Institution of the Rubber Industry, and the shareholders themselves are organised in the Rubber Shareholders' Association—a body which has no counterpart in any other industry.

The Rubber Industry was recently adduced by Prof. W. R. Dunlop, of the Imperial College of Tropical Agriculture, as an outstanding example of the modern tendency to organise an industry right through from the production of the raw material to the manufacture, and it will be seen that there was some justification for his remark.

No industry, however, is self-sufficient, however excellent in some ways may be its internal organisation, and the Rubber Industry is more dependent than most others on external factors not within its own control. This feature is at once its strength and its weakness. In the course of this volume will be reviewed several industries—Tea is an example—where the commodity passes almost without change to the consumer. These industries nearly attain self-sufficiency. The Rubber Industry, on the other hand, cannot—in a broad sense—make its own sales. A review of its various uses will show that in most of its mechanical and electrical applications rubber enters only as an accessory to some other line of manufacture—an absolutely necessary accessory, but still an accessory. Accordingly the pace of rubber consumption is set, generally

speaking, not by the raw rubber producers or the manufacturers' own prowess in producing and promoting sales, but by the speed or slowness of the development of the industries which take the rubber product, or in relation to whose output the sale of the rubber product is restricted. An obvious instance is the rubber tyre, the sale of which must depend on the production and sale of motor-cars. As tyres account for about 70 per cent of the total consumption of rubber, the extent to which the Rubber Industry is a "led horse" will be appreciated.

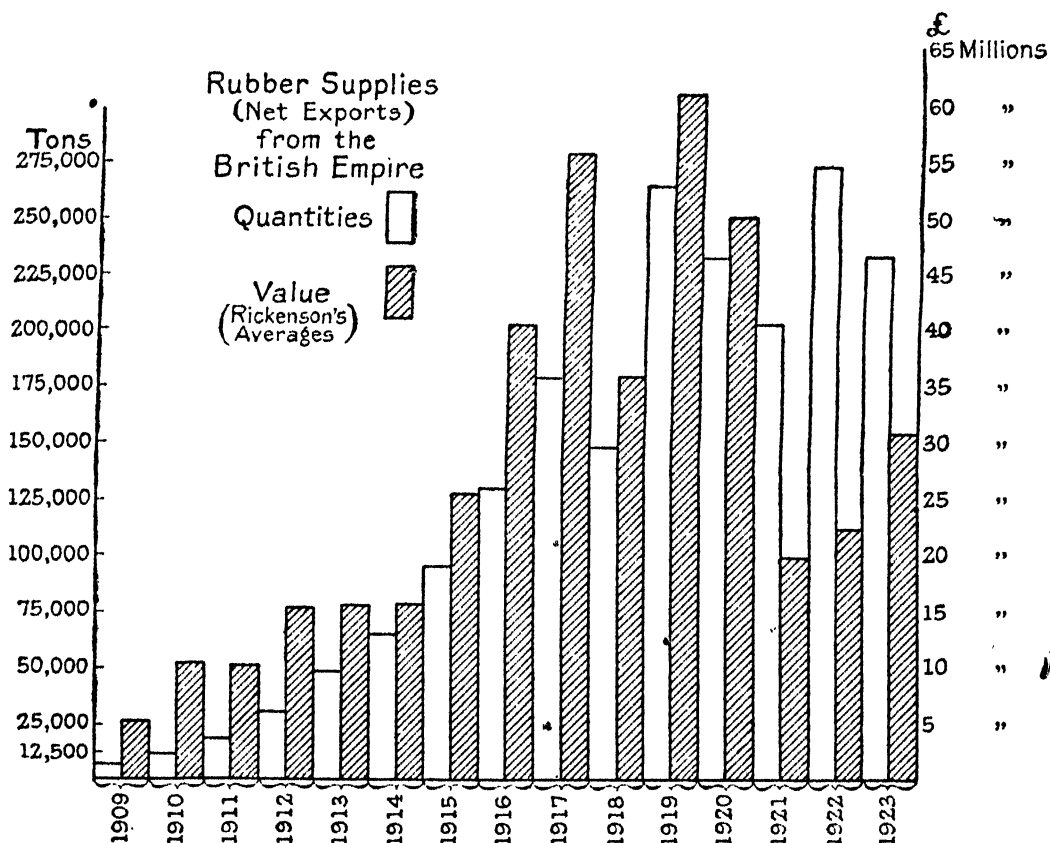
Furthermore, as not Great Britain but the United States is the largest manufacturer and user of motor-cars and tyres, it follows that that country is by far the largest consumer of rubber.

5. THE INTRODUCTION OF COMPULSORY REGULATION OF RUBBER EXPORTS

THE HISTORY OF THE RUBBER SLUMP.—When the British Rubber Planting Industry was started there were few indications of what the future demand for rubber might be. The motor-car industry was then in its infancy and it was possible to take a wide variety of views as to its probable development. As the Para rubber tree takes five years to reach the yielding stage the demand had to be prepared for long in advance. Granted that the inducement was present of a high ruling price level for rubber, it still took a considerable amount of courage to plan and invest for a problematical return five and more years thence. This the ordinary business man who plans perhaps a year ahead, and to turn over his investment several times per annum, will realise. As events have turned out the development of the motor-car has been enormous and any conservative view has been long outdistanced. It is important to glance at the consequences of (postulated) underproduction before reviewing those of overproduction. Had the planting industry halted at a conservative estimate it is no matter of opinion but a certainty that the price of rubber would be at present soaring, while a check would have been put to the expansion of the motor-car industry and the provision of transport and munitions during the war would have been seriously curtailed.

What actually occurred was that the planting-up programmes embarked upon, in conjunction with the haphazard planting by natives and others during the War, created a potential supply in excess of the demand which has been forthcoming in recent years. It is still a moot point whether but for the intervention of the War, with its effect in restricting the natural increase of consumption, the mark would have been overshot at all. As it was, overproduction first began to be felt towards the end of 1917, and was then due more to enforced restriction of consumption owing to war-time regulations than to any other cause. It resulted (as already mentioned) in the introduction by the Rubber Growers' Association of their first scheme of voluntary restriction which continued during 1918. In view of the more hopeful outlook created by the signature of the Armistice it was found impossible to renew the voluntary restriction agreement and prices continued on a downward trend during the first six months of 1919. The demand in this year was comparatively heavy, and

towards the end of it prices rose to substantially over 2s. 6d. per lb., and remained at or over this line for a period of four months extending into 1920. Following the American crisis of the latter year prices sank to a level which was in most cases below the cost of production, and the second Rubber Growers' Association voluntary restriction scheme was brought into operation on November 1st, 1920. This called for the reduction of the monthly outputs from rubber estates by 25 per cent of the estimated monthly normal output and was supported by a large majority of the members of the Association.



Owing to the demoralised state of the American Rubber Manufacturing Industry, which was in no position to effect purchases even at low prices, and to the coming into bearing of large areas of native plantations on which production was unrestricted, this measure of restriction proved of no avail and prices continued to fall. At the same time stocks commenced to accumulate, and this continued during the whole of 1921 and 1922 despite a revival in American buying during the latter year.

APPOINTMENT OF A COLONIAL OFFICE COMMITTEE.—Early in 1921, realising that matters had reached a stage at which drastic intervention was necessary to prevent the bankruptcy of the Industry, and along with it the collapse of the

finances of the rubber-producing countries, the Rubber Growers' Association approached the Colonial Office asking for the introduction of compulsory restriction of output by legislation. This action was supported by the planters in British Malaya. Eventually towards the end of 1921 it appointed a committee, under the Chairmanship of Sir James Stevenson, "to investigate and report upon the rubber situation in the British Colonies and Protectorates in the East," and this committee in its first report, published in May, 1922, went carefully into the position, setting out two plans for dealing with it, but made no definite recommendations because it appeared to it advisable to ascertain what would be the attitude of the Netherlands East Indian Government (as responsible for the countries—Sumatra and Java—next in importance to those of the British Empire as rubber producers) to any combined action to impose effective restriction of output.

COMPULSORY REGULATION BROUGHT INTO EFFECT.—In August, 1922, the decision of the Dutch Minister of the Colonies (that he was opposed to compulsory regulation of production) becoming known, the committee resumed its sittings, and in a second report, published at the beginning of October, 1922, presented a scheme—developed from one of the alternative plans embodied in its first report—which was recommended for adoption, received the assent of the Secretary of State, and was transmitted to the Colonial Governments concerned. Dealt with as a piece of emergency legislation it passed very quickly through the necessary stages and became law both in Ceylon, the Straits Settlements, and the Federated Malay States on November 1st, 1922. With minor alterations it also came into force in the Unfederated Malay States at the same date.

THE PRE-REGULATION SITUATION.—A glance on the chart published on page 47 will show the situation which the new legislation was designed to alleviate, and also partly indicate the extent to which it has been successful in rescuing the Industry from depression.

The diagram shows the "Statist" index figure for the value of "wholesale commodities," the average values of 1913 being taken as 100. The average price of rubber¹ during each year is also shown in percentages based upon the average of 1913 as 100.

One striking point brought out by the tabulation is that the purchasing value of rubber per unit in 1922 was only one-fifth of its purchasing value in 1913² (for the first nine months of 1922 it was even much less than this).

In the same period the exports of rubber from the British Empire increased nearly six times.

The lowest average price was reached in 1922, which was the year marked by

¹ It may be mentioned that this average price of rubber was found by dividing the quantity of rubber imports into the United Kingdom from the British Empire each year into the total value of these imports—both figures being derived from the official Board of Trade returns—and recalculating in terms of the 1913 average price as found in the same way; a "quantity element," therefore, enters into the average which accordingly differs slightly from averages found by methods neglecting quantity.

² The lowest of the pre-War years.

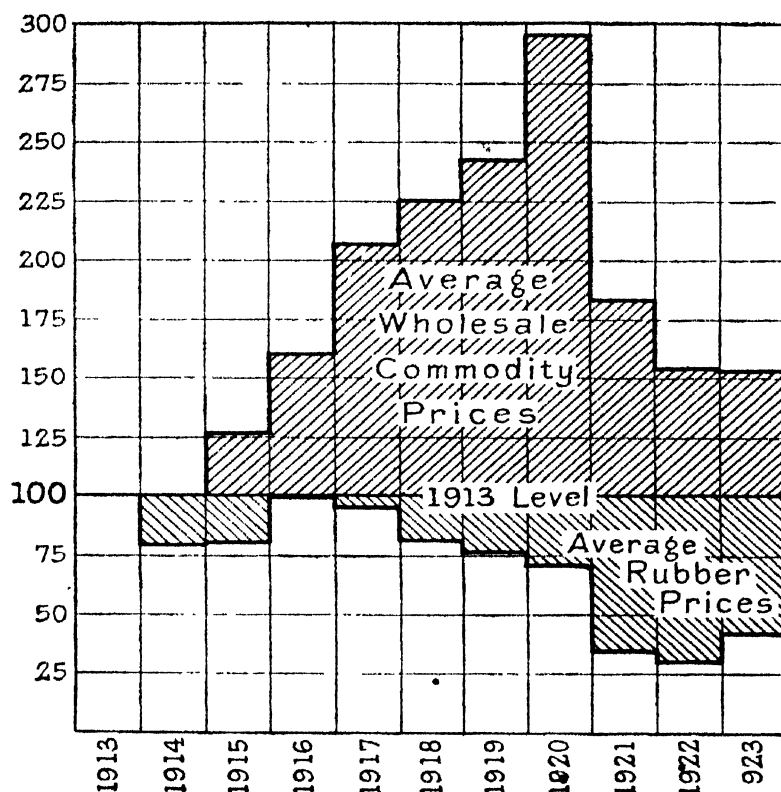
RAW RUBBER INDUSTRY

47.

RUBBER AVERAGE PRICES COMPARED WITH THE STATIST INDEX OF WHOLESALE COMMODITY VALUES (ANNUAL AVERAGES)

1913 level of wholesale commodity values—100

1913 level of wholesale rubber values—100



TOP LINE—Wholesale commodity prices.

DOWN LINE—Rubber prices.

	" Wholesale Commodities " (Statist).	Rubber.	Spread points.	Units of Rubber to be bought with one unit of " Whole sale Commodities."
1913	100	100	0	1.00
1914	100	79	21	1.26
1915	127	80.8	46.2	1.52
1916	160	99	61	1.61
1917	206	95.8	110.2	2.15
1918	226	82	144	2.75
1919	242	76	166	3.15
1920	295	71	224	4.10
1921	182	35	147	5.20
1922	154	31	123	5.00
1923	153	43	110	3.55

the heaviest consumption of rubber hitherto recorded, the manufacturing industry of the United States having been particularly active; nothing further need be said to emphasize the fact of overproduction.

EXPLANATION OF THE STEVENSON SCHEME.—The effect of the legislation embodying the “Stevenson Scheme” is to divide the year into four quarters, November–January, February–April, May–July, August–September, and to create the year ended Oct. 31st, 1920 the standard year for rubber production. One-fourth of the standard year’s production is the standard production for any quarter. Each producing estate is allowed :—

(1) To export at a minimum rate of duty up to 60 per cent of its quarterly standard production in any quarter immediately following another quarter in which the average price of standard quality smoked sheet in London has been maintained at from 1s. to under 1s. 3d. per lb.

(2) To export up to 65 per cent of its standard production for the quarter at the minimum rate of duty in any quarter when the price of standard quality smoked sheet in London has been maintained for the previous quarter at 1s. 3d. to 1s. 6d. per lb.

(3) To export at the minimum rate of duty a further 5 per cent of its standard production for the quarter for every quarter at which the average price of standard quality smoked sheet has remained at from 1s. 3d. to under 1s. 6d. per lb. in London, i.e. should the average for three consecutive quarters have remained within the limits mentioned the proportion for the fourth quarter would be 75 per cent of the standard ($5 \times 3 + 60$).

In the event of the price being maintained at 1s. 6d. or over for any quarter the release allowed in the next following quarter is 10 per cent of the standard production for the quarter, and a further 10 per cent is accorded for each consecutive quarter during which this average has been maintained. The allowance for export at the minimum rate of duty during any quarter is known as the “export quota,” and is announced at the beginning of each quarter. Unexhausted allowances may be carried forward. Exports in excess of the quota may pay an enhanced rate of duty—purposely high to effect the measure of control desired, but affording a safety vent in case of very suddenly increased demand.

Reduction of the export quota may take place as follows :—

(1) When during any quarter—the export quota standing at 60 per cent—the price of rubber as already defined has not averaged at least 1s. per lb. the percentage of standard production for the ensuing quarter is to be reduced to 55 per cent, and if that reduction is not effective in raising the average price over the following three months to 1s. 3d., then it is to be reduced to 50 per cent at the end of three months and so on by reductions of 5 per cent at the end of each three months until that average price is secured. Once the percentage has been lowered it cannot be increased except on a basis of a price of 1s. 3d.

(2) If during any quarter when the export quota is for the time being fixed at not under 65 per cent the price does not average at least 1s. 3d. per lb., the percentage for the ensuing quarter is to be reduced by 5 per cent.

The case of “young producers,” i.e. estates which have no standard pro-

duction because the trees had not reached the bearing stage in the standard year, was originally met by a scale¹ known as the Duncan scale, which set up a table of yields appropriate to trees of various ages. Each young producing estate had its standard calculated according to the scale, which it may be said proved to be the most criticised feature in a scheme the construction of which shows great ingenuity of contrivance and which has proved generally acceptable to the Planting Industry. The cases of estates with no records of production in the standard year, and estates which for various reasons, such as lack of labour, etc., were producing below their normal output in the standard year are met by suitable provisions, and at the inception of the scheme stocks already in existence were exempted from its incidence provided they were declared in due form. Some allowance was also made for the completion of forward contracts which had been entered into before the proposals were known, but the details need not concern us.

It will be seen that the new legislation embodying what has come to be known as the Stevenson Scheme, and contained in its latest form, introducing various safeguards which are the result of experience, in the Export of Rubber Restriction Enactment (F.M.S.), 1923; the Export of Rubber (Restriction) Rules (F.M.S.), 1923; the Straits Settlements Export of Rubber (Restriction) Ordinance, 1922, etc., pivots on the two price levels of 1s. 3d. and 1s. 6d. per lb., figures at which the Stevenson or Colonial Office Committee calculated, with substantial justification, that the Rubber Industry could just pay its way. The former figure works out at less than half the average price of rubber during the pre-War year 1913, and the latter at exactly half. The whole scheme of "let out" and "tighten up" is very ably put together to feed the market with supplies at every advance in price and to reduce these supplies when they are obviously not required, and so prevent further increase in stocks with the former disastrous consequences.

No more could legitimately be expected of Government action, and no less would have met the needs of the case.

ADMINISTRATION OF THE SCHEME.—The measures have legal force in Ceylon and all parts of British Malaya—that is to say in the principal British rubber-producing countries. There is no similar legislation in Borneo or in South India, but estates in these countries have bound themselves to certain measures of voluntary regulation of exports, of which particulars are given later on pages 95 and 91. Hitherto it has not been found possible to bring the Dutch estate owners in the Netherlands East Indies into line, but the majority of British estate owners² in these Dutch Colonies have agreed to restrict their exports voluntarily in conformity with the scale in force in Malaya and Ceylon. The direct administration of the official scheme is carried

¹ For revised scale see p. 119.

² As this volume goes to press it is reported that the response received to date from British Companies operating in the Netherlands Indies shows that Companies representing 247,189 planted acres have agreed to continue during 1924 to support the scheme, either unconditionally or with certain conditions. This represents 91 per cent of the total acreage of British-owned rubber in the Netherlands E. Indies.

out through Rubber Export Controllers in Ceylon and Malaya, and the periodical decisions on the export quota are given by the Colonial Office, assisted by a London Advisory Committee on which sit representatives of the Rubber Growers' Association, two Rubber Manufacturers' Associations, the Association of British Malaya, the Ceylon Association, and Colonial Office representatives, with Sir James Stevenson, Bt., G.C.M.G., as chairman.

CONSOLIDATED STATEMENT OF RUBBER SUPPLY (NET EXPORTS) FROM THE BRITISH EMPIRE,

	1909	1910	1911	1912	1913	1914	1915
British Malaya	3,340	6,514	10,782	20,327	33,641	47,018	68,273
British India	80	194	447	731	1,162	1,641	2,354
Ceylon	666	1,472	2,935	6,513	11,324	15,336	21,787
Sarawak	180	154	180	148	253	310	570
State of North Borneo	52	72	111	234	491	622	1,053
Brunei	—	—	—	—	—	—	—
Total British Eastern Possessions and Protectorates	4,318	8,406	14,455	27,953	46,871	64,927	94,037
<i>British African Colonies and Protectorates.</i>							
Nyasaland	12	26	21	27	29	16	20
Colony and Protectorate of Kenya and Uganda Protectorate	126	131	74	43	70	73	51
Tanganyika Territory	—	—	—	—	—	—	—
Nigeria	619	1,179	966	705	510	166	248
Gold Coast	1,180	1,438	1,191	893	588	292	289
Other African Colonies	34	27	42	83	71	23	8
Total British Africa	1,980	2,801	2,294	1,751	1,268	570	616
<i>Oceania and W. Indies</i>	<i>17</i>	<i>10</i>	<i>14</i>	<i>23</i>	<i>48</i>	<i>69</i>	<i>125</i>
Total British Empire	6,315	11,217	16,763	29,727	48,187	65,566	94,778
Total World Supply	70,000	77,000	79,000	101,000	115,000	120,500	159,000
Approximate absorption by manufacturers	72,500	75,000	77,500	95,000	105,000	120,000	150,000
Approximate cumulation of stocks in consuming countries and shipments afloat since 1913	—	—	—	—	10,000	10,500	19,500

The effect of the announcement that the Government scheme of enforced regulation of exports had been recommended by the Stevenson Committee was immediate, and the price of rubber, which had stood in September, 1922, at under 7d. per lb., rose by November to 1s. 1d. per lb., and by the end of the year to 1s. 2d. per lb. At the end of the first restriction quarter on January 31st it was 1s. 6d., and the scheme had already brought about the result it was

framed to attain. Subsequently it fell to 1s. 1½d. on the first release of 5 per cent being accorded and rose again to just over 1s. 3d. on this release being taken off.

The Industry's first year or fourteen months' experience (to 31st December, 1923) of the regulation of exports has thus been entirely unsensational. The price has been maintained at an average of 1s. 3d. per lb. from the start, with

WITH FIGURES FOR WORLD PRODUCTION AND ESTIMATED CONSUMPTION AND STOCKS

1916	1917	1918	1919	1920	1921	1922	
96,766	137,388	114,439	205,968	178,610	151,001	212,326	British Malaya
3,366	3,763	6,208	5,624	6,376	5,305	4,854	British India
24,334	31,853	21,080	44,818	41,590	40,210	47,367	Ceylon
1,024	1,750	1,506	2,249	1,593	2,102	3,770	Sarawak
1,937	2,449	2,596	3,941	4,117	3,121	3,749	State of North Borneo
—	—	—	—	153	88	141	Brunei
27,427	177,203	145,829	262,600	232,439	201,827	272,207	Total British Eastern Possessions and Protectorates
							<i>British African Colonies and Protectorates.</i>
21	27	15	53	57	20	40	Nyasaland
82	64	83	110	129	34	50	Colony and Protectorate of Kenya and Uganda Protectorate
—	—	—	(107)	(196)	(33)	(12)	Tanganyika Territory ¹
395	392	398	157	492	85	124	Nigeria
989	1,322	621	322	133	46	7	Gold Coast
10	10	4	15	15	—	—	Other African Colonies
1,517	1,816	1,121	657	827	185	221	Total British Africa
144	140	207	303	331	250	89	Oceania and W. Indies
29,088	179,159	147,157	263,560	233,597	202,262	272,517	Total British Empire
205,000	270,250	224,300	406,000	348,000	303,400	402,400	Total World Supply
80,000	230,000	220,000	330,000	310,000	265,000	380,000	Approximate absorption by manufacturers
.	.	.	.	.	.	.	Approximate cumulation of stocks in consuming countries and shipments afloat since 1913
44,500	84,500	88,800	164,800	202,800	241,200	263,600	

a comparatively small range of fluctuations, in the face of a heavy falling off in American consumption in the latter half of 1923, and in spite of the dire forebodings entertained by some onlookers on what was regarded as a hazardous experiment. The difference between the above-mentioned average price of 1923 and the average of 1922,—itself influenced for several months by the

¹ Mandated Territory (not included in the additions).

incoming of the legislation—is the difference between a loss and a small profit, not forgetting that the latter price was realised on a smaller production. In this connection may be quoted a recent pronouncement by Mr. P. J. Burgess (the chairman of the Rubber Growers' Association in 1923-24), in which he gave his estimate of what Legislative Regulation of exports has done for the British Rubber Planting Industry.

In the summer of 1922 the Rubber-growing Industry was on the brink of disaster.

Past profits had paid heavy toll in taxes—E.P.D. and income-tax—for two years there had been no profits, and many large losses had been made. Conservative capitalisations had left no margin of cash in company treasuries, and in London and Europe no finance was forthcoming except under reconstruction and change of ownership conditions. Interests from the United States were feeling the way to acquisition of bankrupt properties, and there was no gleam of hope. In the East staffs of Europeans were at skeleton condition, labour prices were at the minimum, and much necessary work was left undone, even on estates, where bare upkeep could still be financed. Longer continuation of such conditions would have been the last straw to the camel's back, which was dangerously bent. Stocks of rubber in London were still accumulating—stocks which, if not unwanted, were certainly spoken of as such by buyers.

Shareholders—of whom there are nearly a quarter of a million in Great Britain—had unsaleable shares on their hands, looked askance at by themselves and their friends as well as by their bankers.

And what has the scheme in operation done?

It has changed the whole outlook, and in place of pessimism created confidence and hope. It has raised the price of rubber from below cost to a small profit-earning basis. It has re-established the values of estates and shares in them to something approaching their actual cost price.

It has made secure the continuation of rubber plantations in good order and condition as future sources of large supplies, which will surely be wanted.

It paves the way to further development to meet the demand of the future.

It has brought the price of rubber to half what it was three years ago, when it was regarded as cheap, and to a third of the figure at which manufacturers used not to grumble, and at which they established their businesses and made their profits.

The testimony of Mr. Alexander Johnston, managing director of the North British Rubber Co., Ltd., of Edinburgh, and present chairman of the India-rubber Manufacturers' Association, may also be given:—

[EXTRACT FROM SPEECH.]

When opponents of the measure of Rubber Export Regulation talked on the subject from the point of view of the law of supply and demand, he confessed that it left him extremely cold.

As a matter of fact, he believed we were interfering with the law of supply and demand all day long, and he supposed the first man who interfered with that law was probably the man who first started a dairy and left the calf out in the cold, bitterly bewailing the shortage of supplies. Any nation that put a tariff on the import of manufactured goods—he instanced the United States of America—was certainly interfering with the operation of the law of supply and demand, and yet hitherto he had failed to detect any serious sign of disaster in the case of such nations. He believed they could take it that the law of supply and demand was not quite the inflexible economic law that a

good many theorists imagined it to be, but that its operation might be wisely regulated. At any rate, he believed he was safe in saying that, whatever the attitude adopted by any particular class of manufacturers, they were all intensely sympathetic with the plantation industry. Some of them might object to the particular methods of assistance; there was bound to be considerable diversity of opinion on any matter of that kind, but he believed they all recognised that it was not economically sound for any industry to continue producing and selling at below the cost of production. Not only was it economically unsound, but it was economically impossible; obviously, there could only be one end to such a course, and that end would be equally disastrous to the manufacturers as to the producers.

6. THE STATISTICS OF RUBBER PRODUCTION AND CONSUMPTION IN THE EMPIRE AND IN THE WORLD

The table on pp. 50, 51 shows the supply of rubber shipped from the rubber-producing countries of the Empire from 1909 to 1922 and figures of the world's rubber-production have been added for comparison. During certain years stocks accumulated in the East, and these are, of course, entered against their year of shipment and not against the year during which they were produced. The approximate absorption by the rubber-goods manufacturing industries of the world is also shown, as well as the cumulation of stocks in consuming countries. This latter figure includes rubber afloat at the year-end. Since the output statistics of the various Colonies are fully reviewed elsewhere, it is unnecessary to make further comment on this table.

IMPORTS BY CONSUMING COUNTRIES.—The following table shows the net imports into the various rubber-consuming countries :—

NET IMPORTS OF RUBBER BY CONSUMING COUNTRIES

	1919	1920	1921	1922
United Kingdom	42,521	56,969	42,116	11,101
Canada	8,755	11,907	8,247	9,368
Australia ¹	1,000	2,616	2,657	1,500
United States	236,958	248,746	179,634	296,278
France	20,101	16,278	14,828	27,660
Italy	9,895	6,124	3,906	6,431
Japan	10,774	6,063	23,164	16,581
Germany	4,500	12,604	21,583	27,551
Austria	—	—	883	532
Spain	3,702	4,109	3,557	2,944
Holland	2,772	5,510	1,022	—3,804
Norway	438	242	191	325
Sweden	2,023	1,567	814	1,248
Denmark	697	500	256	134
Belgium	3,994	3,408	1,705	204
Russia	—	511	180	2,424
Czecho-Slovakia	771	428	275	274
	<hr/> 348,901	<hr/> 377,582	<hr/> 305,018	<hr/> 400,731

¹ Australian imports of rubber are officially reported by value only; the tonnage has been calculated roughly on average price of rubber.

With the exception of the United Kingdom, the United States, Holland, and Belgium these figures no doubt represent local consumption fairly accurately. In the cases of the four countries mentioned, they include the accumulation of large stocks during the period. The United Kingdom, for instance, during the four-year period retained 152,707 tons of rubber as net imports, but stocks in the recognised public warehouses increased in the same time from 16,134 to 81,081 tons, making the net deliveries for home consumption (or to non-recognised warehouses) 86,760 tons—an average of 21,690 tons a year. This accords fairly closely with the Mincing Lane estimate that the consumption of rubber in the United Kingdom varies from 20,000 tons in bad years to 27,500 tons in moderately good years.

Holland and Belgium also import and warehouse rubber, and the former country, it will be observed, was able to export in 1922 no less than 3804 tons more than was imported. In the U.S.A., of course, large stocks were built up during the period.

The United Kingdom, Canada, and Australia are the only considerable rubber-consuming countries in the Empire, and on the statistical showing it is doubtful whether they have ever consumed as much as 40,000 tons in one year. So far as the United Kingdom is concerned heavy importations of foreign tyres are largely accountable for the relatively small home consumption of rubber.

The details of the imports of raw rubber into the United Kingdom for recent years are given on the opposite page.

7. ORGANISATION OF THE LONDON RUBBER MARKET

London is the centre of the world's trade in raw rubber; the business is of enormous dimensions and no other market in the world can compare with it in volume of transactions. The legislating body for this trade is The Rubber Trade Association of London (7 Mincing Lane, E.C. 4).

The tonnage of rubber arriving in, and shipped from the Port of London, is, of course, no indication whatever of the total volume of trade—for London, in a market sense, handles the rubber supply of the world.

The principal forms of contract on which rubber is sold in London are :—

- (1) Delivery in London and/or Liverpool (London landed terms).
- (2) Shipment direct from the country of origin to a destination required by the buyer—chiefly New York (c.i.f. contracts).
- (3) Delivery in Singapore or Colombo, etc. (godown contracts).
- (4) F.o.b. contracts.
- (5) Spot contracts.

There is also a business in reshipment to the Continent and America and elsewhere from stocks held in London. This, of course, is in the hands of dealers and hardly enters into the present survey since it is not systematised to the same extent. Its volume may be gauged from the statistics of reshipments from this country, and it is much affected by sterling exchange.

RAW RUBBER INDUSTRY

55.

	Quantity.			Value.				
	1913.	1920.	1921.	1922.	1913.	1920.	1921.	1922.
	Centals of 100 lbs.	Centals of 100 lbs.	Centals of 100 lbs.	Centals of 100 lbs.	£	£	£	£
From British West Africa :—								
Gambia	153	17	—	—	1,483	103	—	—
Sierra Leone	166	1	—	—	2,285	11	—	—
Gold Coast (including British Togoland)	14,925	2,311	773	90	147,098	22,239	4,100	307
The Colony and Protectorate of Southern Nigeria	8,758	—	—	—	86,035	—	—	—
Protectorate of Northern Nigeria	937	—	—	—	7,377	—	—	—
Nigeria (including British Cameroons)	—	8,315	2,180	3,157	—	77,347	10,513	11,929
Cape of Good Hope	1,864	738	—	—	3,204	7,426	—	—
Natal	2,647	134	—	—	4,364	1,680	—	—
British East Africa :—								
Zanzibar and Pemba	384	1,970	78	38	5,175	16,969	390	190
Kenya Colony	1,950	5,157	790	934	26,973	49,344	3,624	3,178
British India	19,655	122,868	86,599	64,168	228,038	1,308,035	438,415	282,723
Straits Settlements and Dependencies (including Labuan)	338,313	665,164	506,837	377,195	5,296,206	6,499,413	2,437,942	1,598,923
Federated Malay States	221,304	671,512	580,690	502,424	3,532,173	6,860,824	2,872,887	2,302,447
Ceylon and Dependencies	150,182	479,829	331,142	227,214	2,309,324	4,657,041	1,586,598	988,198
British Borneo	3,924	24,581	25,455	18,219	62,641	250,165	122,375	75,687
Other British Possessions	11,618	7,079	4,576	2,683	27,458	63,747	19,654	10,721
British Empire total	776,790	1,989,676	1,539,120	1,196,122	11,739,834	19,814,344	7,496,498	5,274,303
Foreign Countries (total)	797,649	492,234	363,987	234,700	8,784,185	4,703,377	1,742,590	1,012,210
Total Imports	1,574,439	2,481,910	1,903,107	1,430,822	20,524,019	24,517,721	9,239,088	6,286,513
Shipments	1,008,269	1,208,595	960,353	1,168,202	14,836,604	13,866,823	3,993,145	4,601,365
Net Imports	566,170	1,273,315	942,754	262,620	5,687,415	10,650,898	5,275,943	1,685,148
Net Tons	25,275	56,969	42,116	11,101	—	—	—	—

THE F.O.B. CONTRACT.—The two last-named of the above contracts may be quickly disposed of. The f.o.b. contract was a war measure, but is still used to a certain extent. It is a c.i.f. contract with the difference that sellers are agents as regards freight and insurance for the buyer. The rubber is sold f.o.b. a certain port, but the seller also undertakes to ship it wherever his customer—in instructions given subsequently—decides. It will easily be understood how useful this was during the War and how convenient it still may be in some circumstances. Buyers must declare the port to which they require shipment not later than sixty days previous to the first of the month named for shipment—or thirty days previous providing they pay cabling expenses. Sellers pay insurance, which buyers refund net without interest. Freight, if prepaid by sellers, is refunded by the buyers without interest, any deferred rebates being to seller's account.

THE SPOT CONTRACT.—The spot contract (for rubber actually in London or Liverpool at the time it is sold) is a simple document showing the sample mark, the number of cases, and the price. Spot sales are made on sample. Prompt or spot contracts is the Wednesday fortnight following the sale. Unless otherwise specified in the contract the sale of a parcel as spot implies that buyers are entitled to delivery order not later than 2 p.m. (Saturdays 11 a.m.) on the second day following receipt of application for delivery, and in default to cancel the contract. Damages incurred in consequence of default are assessed by arbitration.

The contracts numbered (1), (2), and (3) in the list given above are generally regarded as the most important.

THE DELIVERY CONTRACT (LONDON AND/OR LIVERPOOL).—The delivery contract relates to sales or purchases of rubber to arrive in London or Liverpool, and states briefly that the brokers have (this day) bought (or sold) "by your order and for your account of our principals, whose solvency we guarantee," . . . lb. (or tons) of plantation rubber, in cases, at . . . per lb., *Standard Quality Hevea brasiliensis*, first crêpe (or ribbed smoked sheet, as the case may be), to be ready for delivery in warehouse in London and/or Liverpool, any time or times *at sellers' option*, during the months of . . .

When a parcel of rubber is sold on delivery terms under one of the standard descriptions for a specified shipment or arrival, or for shipment or arrival by a specified steamer, and found inferior, or if any portion tendered is found inferior, buyers have the option of rejection, and the quantity so rejected does not constitute a delivery on the contract. If the time for delivery has expired, the seller is allowed three clear working days to replace the quantity rejected, or, failing this, buyer claims default.

THE C.I.F. CONTRACT.—A large tonnage is sold on the c.i.f. contract¹ for U.S.A. and Canada, and in view of its importance it is reprinted in an appendix to this volume.

Among the features of the contract may be noted Payment *in London* against delivery of shipping documents.

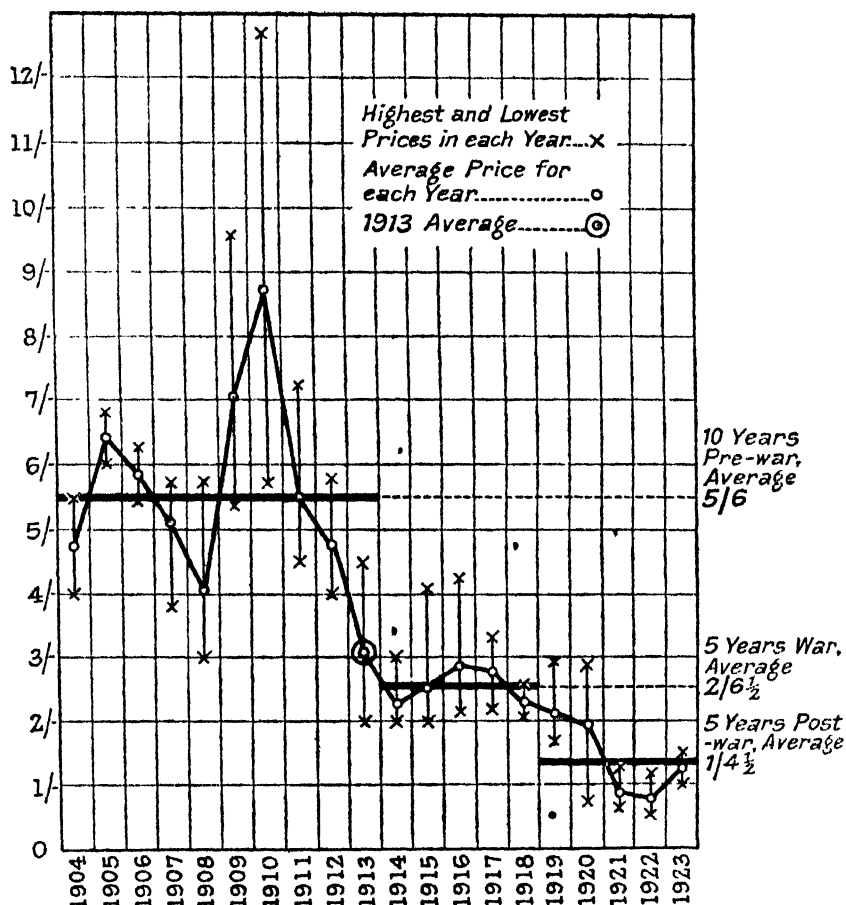
¹ A special C.I.F. Contract for business with the Continent is now being drafted.

If quality is found inferior, and failing an amicable settlement, buyer must accept same with a fair allowance to be settled by *arbitration in London*, unless the arbitrators decide that the shipment is not *bona fide*, in which case arbitrators shall fix an allowance, and buyer has the option, to be exercised within five business days from receipt of award, of rejecting the rubber and claiming default or accepting it with the allowance.

Notice in writing of any objection on the ground of quality must be received by seller (or his broker) in London not later than twenty-eight days after discharge of the goods at destination named in the contract, and sample or samples in support of the claim must be produced in London within eight weeks from the same date.

20 YEAR RECORD OF THE RAW RUBBER MARKET

The prices for 1904 refer to Fine Hard Para ; later to First Grade Plantation Para Rubber.



Practically every quality the buyers want is sold c.i.f. America, but as the out-turn of the estates is about 80 per cent of standard quality the majority of rubber sold in this manner is standard.

THE GODOWN CONTRACT.—The godown contract refers to rubber sold in London for delivery, usually in Singapore or Colombo, but often also in Sourabaya and other Dutch East Indian ports. After the usual clause guaran-

teeing solvency of principal it provides that delivery is to be made in sound cases to the godown of Messrs. . . . in Singapore (Colombô, etc.).

The quality clause refers to fair London standard quality, or, if inferior, a fair allowance to be made, to be settled between buyers and sellers, either amicably, or failing this, by arbitration in Singapore or Colombo. Payment in cash against delivery in Singapore (or Colombo) at banks buying sight rate of exchange on London. The export duty is for sellers' account and the sellers' agents in Singapore are named.

PROCEDURE OF WEIGHING AND SAMPLING.—The London rubber market has grown to its present importance and acquired its immense prestige partly through the position of London as the world's financial centre and partly through the circumstances of the Rubber Planting Industry having been developed by British companies, but principally and more directly through the reputation it has gained as an easy and safe market to deal in. This reputation is a consequence of its organisation, providing safeguards at every step, and the character and stability of the firms making up its personnel. The way in which the various contracts are continually being revised to fit them to changing conditions has also a great deal to do with the maintenance of London's importance as the premier rubber market. The c.i.f. contract, for instance, has passed through half a dozen different editions in the course of comparatively few years, and may confidentially be expected to pass through several more before a final form is evolved, if that ever happens.

As it is part of the system of keeping a check at every point and affording the fullest guarantee to both buyer and seller that the utmost care has been exercised in their interests, the procedure in weighing and sampling may be described. The standard of weighing and sampling in any market centre is the foundation of its reputation for fairness. In London, and also in Liverpool, it could not be higher than it is. Rubber on arrival in London must be warehoused at one of the recognised rubber wharves.¹

Having arrived alongside their own wharf, the packages are weighed gross for the protection of the wharfingers and the sellers against pilferage. The wharfingers then proceed to open the whole hundred per cent of cases. The rubber is laid on the floor with the cases next to it, and they then proceed to weigh net. The whole lot is then sampled, and a sample which, in the wharfingers' opinion, represents the bulk is drawn, after which the rubber is put back into the cases and weighed gross. An endeavour is being made to simplify and cheapen this system by ascertaining the net weight only, but

¹ These are docks, wharves or warehouses under the sole control of the following warehouse-keepers:—In London: Port of London Authority; Beresford and Co. (St. Olave's Wharves), Ltd.; P. R. Buchanan and Co.; Proprietors of Bull Wharf, Ltd.; Butler's Wharf, Ltd.; Colonial Wharves Ltd.; R. G. Hall and Co. (St. John's Wharf); Proprietors of Hay's Wharf, Ltd.; British Bluefries Wharfage and Transport, Ltd.; Thames Export Packing Co., Ltd.; Hoare, Wilson and Co.; Leach and Co., Ltd.; Litchfield and Soundy, Ltd.; Major and Field; W. M. Smith and Son; Weber, Smith and Hoare; Metropolitan Bonded Warehouses, Ltd.

Liverpool: John H. Burns; William Dean and Co.; Henry Diaper and Co.; Liverpool Warehousing Co., Ltd.; Pickfords Ltd.; Mersey Docks and Harbour Board; Liverpool and Manchester Cotton and Produce Storage Co., Ltd.

details are still being worked out. The rubber having been repacked, the sample is sent to the broker with a certificate of weight. This certificate shows the gross and the tare in each case, and at the bottom the net weight is shown. This weight stands for one year.

The charges for these operations are :—

INDIA-RUBBER (Plantation), in cases :—

Landing and Housing Rate, including weighing gross at landing and reweighing on importer's account if required	Per	s.	d.
	cwt. gross	0	8

Management Rate, including landing, housing, weighing gross at landing, Customs' examination, taring, ordinary coopering for town delivery, weighing after working, and one week's rent from date of vessel breaking bulk, and reweighing on importer's account if required :—

	Per	s.	d.	
under 100 lbs.	100 lbs.	2	0	}
100 lbs. and „ 150 „	„	1	8	
150 „ „ „ 200 „	„	1	5	
200 „ „ over	„	1	4	
				On the average gross weight of each mark.

The Management Rate applies unless notice is given to the contrary before landing.

Reweighing on Buyers' account	Per	d.
	cwt. gross	2
Rehousing or Repiling, when incurred		2
Delivery to land conveyance		2
Delivery to water conveyance		4
Rent per week, after one week from date of vessel breaking bulk	100 lb. gross	0 0½

Plus 47½ per cent on rent and 55 per cent on all other charges.

The sample having reached the broker with the certificate of weight, he proceeds to sell it. If the rubber is required for a forward standard quality contract it is sent up for award ; if not, it is sold on the spot on the contract already mentioned.*

STANDARD QUALITIES COMMITTEE.—All rubber sold under standard descriptions on London landed contracts must, before being tendered, go before the Standard Qualities Committee of The Rubber Trade Association for award as "standard quality first latex crêpe," or "ribbed smoked sheet."

The Committee, composed of brokers and dealers who are good judges of rubber, meet twice a week to issue awards on these two grades. The tender can then go out with the award number, showing that it has been awarded before tendering.

When the Committee was first formed all sorts of colours were submitted for consideration, from a light grey to a light yellow crêpe. Gradually a standard was evolved and, unfortunately, it really became a colour standard. At the time pale crêpe was fetching a premium over other grades, and consequently the standard was based more or less on colour at the beginning. Subsequently the Committee, while continuing to lay stress on colour, also took into consideration (for crêpe) texture, thickness, and freedom from discoloration, and formed a standard which called for the lightest colour, clean and even texture. With regard to sheet, the defects looked for are oversmoking, too

quick coagulation, which is apt to form air bubbles in the sheets, traces of bark and uneven texture.

The certificates given by the Standard Qualities Committee remain in force for three months from the last day of the month in which the certificate is dated, provided the cases have been left intact at the original public warehouse. Samples to be submitted to the Standard Qualities Committee must be dock or wharf, or Liverpool warehouse-keepers' samples drawn after working at the customary manner and delivered intact to the Committee within three months of date of drawing. The Committee also delivers quality certificates for crêpe sole rubber.

INTRINSIC QUALITY.—From this brief account of the methods adopted by the Standard Qualities Committee, it will be gathered that its work consists of interpreting and applying the market standard of quality. This is not necessarily closely related to the intrinsic qualities of the rubber for manufacturing purposes.

However, for the purpose of carrying on a big market business in rubber, mostly on forward contracts, there must be a primary valuation of the kind just noticed, and through the means of the Standard Qualities Committee it is conducted to the satisfaction of all concerned.

A secondary valuation of the rubber on its real value for the manufacturing purpose they have in mind is, however, made by many of the bigger users who obtain test samples before buying. Such firms will cover themselves for their requirements against the risk of the market by buying rubber for forward positions, but, as likely as not, will sell it as the position becomes nearer and use rubber bought on samples which have been tested. The tests to determine intrinsic value are mainly of such a character as will enable the manufacturer to judge of the manner in which the material will behave towards the vulcanizing process, and of its strength, resilience, resistance to abrasion, durability, and the like, after manufacture. The vulcanizing process consists essentially in beating the rubber, after it has been plasticized, with sulphur, and this gradually brings about a toughening of the material and a general improvement in its properties, such as strength, resistance to heat and cold, resistance to oils and solvents, capacity to recover shape after distortion. Different rubbers may vary as regards the *rate* at which these changes occur, as well as in respect to the maximum or minimum values attainable. Variability as regards *rate of change* may involve an alteration of the manufacturing process which is inconvenient and undesirable in many respects, and, if this feature is pronounced, it may cause more trouble than actual differences in strength, etc., of the finished goods. Samples are therefore tested for "rate of cure," as it is called, and for strength, distensibility and other physical characteristics, the latter tests being applied after the experimental vulcanization process has been completed. Tests may also be applied to estimate the amount of moisture and impurities (such as sand, splinters from packing cases) in the rubber, but, as a rule, these amount to very little in plantation rubber, which for most purposes can be used without the preliminary purification (washing) which is essential in the case of "wild" rubbers.

IDENTIFICATION MARKS ON RUBBER.—In this connection arises the question

of the consumer buying rubber on the identification marks of the various estates instead of upon description. The director of the Research Association of British Rubber and Tyre Manufacturers recently made the statement that manufacturers are practically unanimous in desiring to know the sources whence their rubber is derived in order to be in a position to select the estates whose products give the most satisfaction.¹ Brokers and dealers (who buy from brokers and supply consumers) apparently see many objections to this procedure, their desires being all in the direction of the kind of simplification on which a large turnover can be worked easily—a plan which they believe has helped the growth of the London market. Purchase can, of course, often be arranged of the whole or a proportion of the coming year's output of particular estates.

THE RUBBER EXCHANGE.—The Rubber Exchange (9 Mincing Lane, London, E.C. 3) is a centre of meeting for the Rubber Trade and is connected by private telephones with the offices of all the leading firms. Its opening has greatly facilitated business.

THE RUBBER SETTLEMENT HOUSE.—The Rubber Settlement House exists for the registration and settlement of forward contracts made between its members (brokers and dealers) when acting as principals on the face of the contract. The actual turnover of contracts registered in 1923 was 240,000 tons (109,000 tons in 1922). The membership is restricted to members of the Rubber Trade Association of London. Contracts are registered in multiples of 5 tons and smaller quantities, and settlements take place at fortnightly intervals, though there is power to call for an extraordinary settlement in the case of necessity.

The Clearing House principle is well known and the rules of the Rubber Settlement House only differ in details from those of other institutions of the kind. The effect is to reduce the risk of either party to a settlement contract to the fluctuation of the market in a fortnight's time. The Settlement House is largely used for hedging and speculation.

BROKERAGE.—The Settlement House brokerage charge is $\frac{1}{2}$ per cent on all contracts (to other members). For the seller on an ordinary delivery contract (London landed terms) the rate is $\frac{1}{2}$ per cent for the current month and three months following, and 1 per cent for positions beyond three months. On c.i.f. contracts it is $\frac{1}{2}$ per cent for the current month and two following months only—positions beyond two months 1 per cent. For godown contracts it is 1 per cent any position. All these rates apply to business done between members of the Rubber Trade Association only.

"SET-OFF."—An important accretion to the stability of the London rubber market is to be found in its refusal to agree to the proposition that every bargain entered into between the same parties stands by itself as an enforceable contract. The trade custom of "set-off" means that in the event of a default arising, the sum due from one party in respect to one contract can be set off against the sum due from the other party in respect to the second or further contracts and the balance, and no more, of the accounts can be claimed or need be paid.

¹ Several manufacturers including the leading French consumers (Michelin) furnish a list of estates from which rubber for their requirements must be selected.

ARBITRATION.—With regard to arbitration in London, this cannot arise, of course, on the quality of rubber awarded as standard quality. On other questions the chairman of the Association appoints a dealer and a broker or producer and an umpire, who must be a broker, and they thrash out the question. If the parties are dissatisfied they may appeal to the Rubber Trade Association, who appoint a panel of seven, namely: two importers, two dealers, and two brokers, and a chairman, and they go into the question and issue a reward, which is binding on both parties, unless they choose to go to law. In very few cases, however, do the parties resort to litigation. Other than godown contracts, all disputes of any description whatever are settled by arbitration in London on all contracts.

OFF-GRADES.—Lower grades, when sold, as they often are, on forward contracts, are bought on type sample. In such cases the seller often protects himself against the fluctuations of the market by buying a similar quantity of standard quality rubber.

CHAPTER II

GEOGRAPHICAL SURVEY: RUBBER

1. THE RAW RUBBER INDUSTRY OF BRITISH MALAYA

[Statements and data revised to January, 1924; principal statistics complete for 1923; full for 1922-23.]

Rubber Exports from British Malaya. Acreage in British Malaya. Yield per Acre. Cost of Production. Profit Record of Malay Rubber Undertakings. Research Work in Malaya. Rubber Tree Diseases. State of Upkeep of Plantations. Native Rubber Plantations. Manufacture of Native Rubber. Organisation of Native Rubber Production on Co-operative Lines. Inland Transport. Singapore Rubber Market. Labour in Malaya.

THE Malay Peninsula with Singapore and Penang Islands is by far the largest rubber producer, not only in the British Empire, but in the world. Here is located about three-fifths of the world's total acreage of plantation rubber. Malaya indeed has become a rubber country to the exclusion of all other planting industries—except an area of 133,000 acres under coco-nuts, which is not much more than a twentieth of the acreage devoted to the premier product. As a result, all interests are bound up in the success of the Rubber Industry, and any setback affects the whole economic life of the country and the finances of government to an alarming extent. Huge sums were invested annually from about 1906 to the outbreak of war, principally by the British public, but also by local companies financed by Singapore capitalists, Shanghai companies, and a considerable number of

Japanese concerns. Native growers and one large American company, though not among the first-comers, also took a hand, and in later years the former have come to occupy a position of importance that was little expected at the time of the inauguration of the Industry. More than one Continental financial group of importance also has its interests, and the various phases through which the Industry has passed have been watched with as keen attention in Paris and Antwerp as in London, Glasgow, and Edinburgh, where the headquarters of many of the principal companies are to be found.

Geographically the countries of the Peninsula naturally fall into one group, and politically they are united under the British flag. The mode of government, however, differs, and owing to the number of separate administrative units the collection of trade and other statistics relating to the group as a whole presents some difficulties.

The flat lands, such as are to be found in the Klang district, were the first to be planted up; undulating land within easy reach of road or railway was next taken in hand, and—when this was no longer available—steeper hill land was planted. Of the three types, undulating land is probably the best. Flat lands are often associated with difficult draining problems, poor yields, and inability of the trees to obtain a good hold after a certain age.

RUBBER EXPORTS FROM BRITISH MALAYA.—The net exports¹ of rubber from British Malaya, as a whole, amounted to 212,326 tons in 1922 (1921—151,001 tons) and the gross to 248,158 tons. The destinations of shipments are recorded for the gross exports only, these including a proportion of foreign-produced rubber :—

GROSS EXPORTS OF RUBBER FROM BRITISH MALAYA¹

(Including shipments of imported rubber)

[Freight Rate Singapore to U.K. (February, 1924) 50s. o.d. per 50 cu. ft. less 10 per cent equals 48/7 net]

	Quantity. Centals of 100 lb.		Value.	
	1921	1922	1921 \$	1922 \$
To United Kingdom	911,006	700,562	29,293,000	19,408,000
„ British Possessions	63,499	80,760	1,877,000	2,348,000
„ U.S.A.	2,299,353	4,044,781	65,952,000	117,753,000
„ Europe	144,703	386,801	4,257,000	10,834,000
„ Japan	442,138	341,470	12,444,000	9,666,000
„ Other Countries	1,868	4,340	• 49,000	141,000
Total	3,862,567	5,558,714	114,872,000	160,150,000
	= 172,436 tons	= 248,158 tons		

¹ The figures for net and gross exports are official. Nevertheless, they probably understate to some considerable extent the quantity of net exports. Large quantities of native rubber arrive in Singapore, containing 20 per cent of moisture; when reshipped this moisture has been extracted. Hence the method of finding net exports by subtracting gross imports from gross exports is misleading. A "Trade" estimate is that, allowing for the abstraction of moisture, the net exports in 1923 may be taken as 196,000 tons instead of 183,943 tons.

The net exports in 1913 were 33,641 tons, so that the increase was over 600 per cent in ten years. For 1923 the gross exports (as cabled) amounted to 252,146 tons and the net to 183,943 tons, the reduction on 1922 figures being due to the operation of the Rubber Export Regulations.

RUBBER ACREAGE IN BRITISH MALAYA.—The following is the latest official return of rubber acreage in Malaya; though referring to the year 1921 it only became public property at the end of 1923 :—

Position end of 1921.	Alienated for rubber growing acres.	Planted acres.	In bearing acres.
Federated Malay States (large and small holdings)	1,641,620	1,234,895	790,485
Straits Settlements (large holdings) .	251,321	200,428	142,355
„ „ (small holdings) .	134,434	125,289	60,648
Unfederated Malay States :—			
Large holdings {	1,320,606	359,580	191,231
Small holdings {		304,354	131,749
Not distinguished {		1,690	363
Total Malaya	3,347,981	2,236,236	1,316,831

For all practical purposes the figures for planted acreage shown in the table holds good to-day (January, 1924), for there has been little planting of rubber since 1921. On the other hand, the proportion of the area which has reached the bearing stage must be larger—perhaps by 200–250,000 acres.

The leading association of rubber planters is the Planters' Association of Malaya, a body consisting of thirteen district planters' associations, and representing 568,082 planted acres.

RUBBER YIELD 'PER ACRE IN MALAYA.—For many years—in fact, so long as it continued to be useful—the Rubber Growers' Association compiled annual statistics from estates in its membership showing the average yield per acre in bearing. These statistics ceased to be compiled (or at least issued to the members) after 1917 on account of the incoming voluntary restriction of output which rendered them useless as a measure of yielding capacity. The averages on opposite page were compiled from returns made by 186 estates (the same estates in each year), of which 21 were situated in Johore, 29 in Negri Sembilan, 44 in Perak, 7 in Selangor, and 22 in the Straits Settlements. They may be compared with similar averages for Ceylon, South India, etc., which are given in their appropriate places in this book. It will be observed that the highest average yields were obtained in Negri Sembilan, Perak, and Selangor, which had also the highest average annual rainfall.

The total yield brought into the averages in 1917 was 76,757,833 lb. (equal to an average of 343 lb. from 271,260 acres in bearing of an average age of seven years, eleven months). This was a higher average yield than recorded in 1917 from any other country (including Sumatra, Java, Borneo, Ceylon, etc.) in which the Rubber Growers' Association had reporting members.

It is noteworthy that all the highest average yields reported in column (2) of the table were obtained in 1917 by daily tapping (in two cases, however, certain areas were tapped daily, and the rest alternate days) from estates having a large proportion of trees of ten years old and older. The commonest tapping systems were daily tapping, one cut on one quarter, and daily (or alternate daily) tapping, two cuts on one quarter ; but numerous other systems were

	(1)	(2)	(3)	(4)
	Average yield per acre over whole area.	Highest average yield per acre on any estate.	Percentage of output being first latex. Balance represents other grades. %	Average rainfall in inches.
	lb.	lb.		
Johore 1915	228	480	80·28	84·80
1916	283	488	76·02	76·62
1917	298	478	88·52	112·83
Negri Sembilan 1915	348	510	80·97	104·94
1916	376	503	84·48	91·67
1917	375	524	84·50	110·44
Perak 1915	353	535	82·09	112·07
1916	367	572	85·05	95·79
1917	382	591	81·48	110·41
Selangor 1915	331	494	81·55	95·20
1916	340	594	86·38	94·75
1917	344	607	84·18	103·68
Straits Settlements 1915	243	406	77·69	86·90
1916	252	480	83·26	88·12
1917	247	446	80·75	94·14

employed. The highest average yields per tree over whole estates (in 1917) were :—

7·2375 lb. obtained from an estate in Perak which also yielded the second highest average per acre (560 lb.) for that State. Daily tapping, two cuts on one quarter (685 out of 950 acres planted 1907 or prior thereto).

6·2094 lb. from an estate in Selangor, likewise the second highest yielder in its State per acre. Alternate daily tapping single V on 233 acres, double V on 1155 acres, 1146 acres out of 1388 planted in 1907 or prior thereto.

The most complete census of rubber yields in Malaya, however, was taken in the course of 1922, when the figures of rubber production in the year from the 1st November, 1919, to the 31st October, 1920, were investigated for the purpose of establishing the "standard production" of the estates for the

requirements of the Export Regulation Act, that period being the latest under the normal tapping of the old dispensation.

Figures of their production in the standard year were obtained from no less than 555 estates in the Federated Malay States. The ages of the trees were discoverable, the area of each age, and the total yield. By adjusting the data from these 555 estates on the basis of the scale actually adopted in Malaya during 1922-23, it was sought to establish the yield of the mature trees of eight years of age and over.

On this basis the average crop *per mature acre* was shown to be : 384 lb. over the whole of the 555 estates. In Perak the average was 390 lb. ; in Selangor, 359 lb. ; in Negri Sembilan, 415 lb. ; and in Pahang, 407 lb. The higher average in Negri Sembilan was thought to be due to the relatively larger proportion of native-owned estates, with their more drastic tapping, but we have already found indications of the same phenomenon in the Rubber Growers' Association's statistics on Negri Sembilan yields quoted at the beginning of this statement (p. 65).

Bearing in mind that much of the acreage in the F.M.S. is a great deal older than eight years, there is nothing inherently improbable in these results regarding the average yield of mature rubber in that country, but it must be recognised that they are obtained to a certain extent on a basis of surmise, and it is regrettable that some other way of collecting and presenting the information was not found. The Straits Settlements averages for yields of rubber in 1919-20 were obtained in the same way and show 321 lb. per acre for Province Wellesley and the Dindings and 386 lb. per acre for Malacca.

COST OF PRODUCTION IN BRITISH MALAYA.—The average "all-in" cost of production in Malaya in recent years has been :—

					Pence per lb.
1922-23.	Average for 173 companies ¹	.	.	.	8·3
1921-22.	" 135 "	.	.	.	11·8
1920-21.	" 206 "	.	.	.	15·16
1919-20.	" 198 "	.	.	.	14·31
1917-18.	" 128 "	.	.	.	14·4

These figures include the cost of few, if any, young producers. To submit the 1922-23 figures to analysis : Out of 173 companies, 11 incurred a cost of production of just below 6d., 29 were between 6d. and 7d., 37 between 7d. and 8d., 43 between 8d. and 9d., 26 between 9d. and 10d., 20 between 10d. and 11d., 4 between 11d. and 1s., and 3 over 1s.

Rubber planting is probably unique as an industry in which costs have been brought down far below the pre-War level.

PROFIT RECORD OF LOCALLY CAPITALISED RUBBER UNDERTAKINGS IN MALAYA.—The following table shows the average profit-earning record of the Industry for ten years so far as that can be deduced from the average dividends paid by Dollar Rubber Companies of local registration owning producing

¹ These averages are worked out from the "Statist" tables October 6th and 13th (1923), September 23rd (1922), and July 20th (1918), and from a compilation by Messrs. Zorn and Leigh-Hunt.

properties in Malaya. The averages are calculated from data given in "Facts and Figures of Dollar Companies," issued by Messrs. Fraser and Co., Singapore (1923 and previous editions), but companies owning property elsewhere than in Malaya, and non-producers, have been eliminated.

• AVERAGE DIVIDENDS PAID BY MALAY DOLLAR RUBBER COMPANIES

	1913	1914	1915	1916	1917	1918	1919	1920	1921	1922
Average ordinary dividend per cent	17.10	9.8	15.6	28.76	23.08	4.92	13.41	9.59	9.8	2.06
No. of companies contributing to average	16	27	40	42	52	58	62	63	71	52
No. of companies paying no dividends	0	27	40	42	52	58	62	63	71	52

In connection with this table it should be pointed out that it is much influenced by the favourable forward sales made by several companies extending over the crops of 1920, 1921, and 1922; as a result of these sales such companies were in the fortunate position of being able to pay dividends when the rest of the Industry was working at a loss.

The averages are also affected by the high profits made by a few old-established companies; especially is this so in the earlier years when the average is taken over fewer companies. Thus, one company alone paid 100 per cent dividends in 1913 and 1917.¹ In the former year its figure affected the average to the extent of 6—i.e. it increased the general average from (about) 11 to 17 per cent; in the latter year the same dividend made a difference of less than 2 per cent because of the greater number of companies taken into account. It will readily be understood, therefore, that the omission from the calculation of the profits earned by half a dozen leading companies would leave a very low average for the profits of the remainder.

Unfortunately it has not proved possible to obtain the data regarding as large a number of companies in the earlier as in the later years; the reason for this is partly the formation of a few new companies to take over estates already in bearing and partly the fact that a large proportion of old-established Dollar Companies commenced as private or semi-private companies and have only made their accounts public in recent years. A number of the companies had not issued their accounts for 1922 when Messrs. Fraser and Co.'s Handbook appeared.

The figures as they stand show an average annual dividend of 6.2 per cent for the last five years. However, on an average more than half the companies during this period have paid no dividend at all, and it is evident that if the "average of average companies" only were taken the average dividend per annum during these years would be no more than two or three per cent, if as much.

The average dividend of the five preceding years, 1913-17, is more favourable, but as pointed out is affected to even a greater extent by the result obtained

¹ Nil in 1921 and 1922 however.

by the few really big dividend payers. There would be some measure of reproach attached to the production of such figures regarding an ordinary trading enterprise. However, in the case of rubber, the causes which have led to the Industry becoming, by the standards of tropical agriculture, an unremunerative one, have in the main been outside the control of its leaders. In a sense it has been swamped by its own efficiency in production. No complaint is, therefore, likely to arise on the score of overfrank exposure of the joints in its financial armour. Indeed, all the interests of the Industry are but served by disclosure of the facts regarding its position.

DIVIDEND EARNING RECORD OF STERLING RUBBER COMPANIES IN MALAYA.—

A number of Sterling Rubber Companies having estates in Malaya managed to pay dividends in 1920 and 1921 as the result of having made favourable forward sales of rubber at comparatively high prices. It has already been noted that the average cost of production was in excess of the average market price of the year, and a careful scrutiny of the 1921 results brought under review has failed to reveal a single instance of a company which was able to declare a dividend out of profits made from the sale of rubber at (or near) the average price of 1921. On the other hand, a large number of companies were successful in re-entering the dividend list for 1922, benefiting by the sale of their crops at the higher prices established, as a result of Export Regulation, at the end of that year and during 1923, and also from reduced costs of production.

The following table gives the average dividends of Sterling Rubber Companies with estates in Malaya, but as pointed out below, it exaggerates to an extent which cannot readily be calculated the actual return on capital invested :—

DIVIDEND RECORD OF STERLING RUBBER COMPANIES IN MALAYA

(Financial years in many cases end in the spring of the following year)

	1910	1911	1912	1913	1914	1915	1916	1917	1918	1919	1920	1921	1922
No. of Companies . . .	76	115	129	136	138	138	138	138	138	138	138	138	138
Average Dividend per cent	18	14	17	10.3	11.25	20	24.18	16.9	12.34	22.36	3.23	2.14	5.21
Non-Dividend payers included in average . . .	2.8	1.2	4.1	6.7	4.8	2.2	1.1	1.8	1.8	1.8	1.8	1.8	1.8
Grand Average Annual Dividend, 13 years :	13.6 per cent ; last 5 years, 9.05 per cent.												

The advantage in presenting data as averages over a large number of companies is that exceptional cases of prosperity and adversity tend to cancel each other out and a general view of the state of the Industry is thereby obtained. At the same time it must be pointed out that the method is adopted only in default of a better, and must always give a more favourable view of the earnings of *average* companies than is justified. The upward range of dividends is taken into account in full, while the downward range stops at "Nil."

Apart from this, there is, in the case of Sterling Rubber Companies in Malaya (and also in the case of Ceylon Sterling Companies), a more serious cause of exaggeration of the actual return on capital invested. This arises from the practice adopted by many companies when their shares were standing at a

premium of issuing new shares to the existing shareholders at 25, 50, 100, 200, and even up to 1400 per cent over par value. The fresh capital obtained in this way was invested in the estates for the general benefit of shareholders, but a £1 share issued at £14 premium (as in the case of the issue by the Malacca Rubber Plantations in 1911) still figures for £1 for the purpose of calculation of dividends.

So general has this practice been that over one hundred of the companies included in the foregoing tabulation have at one time or another, or on several occasions, issued capital at a premium. In comparatively recent years—principally in 1919 and 1920—a number of companies, becoming alive to the risks of various kinds involved in understatement of the capital actually invested in their properties, have issued so-called bonus shares representing capital which had previously been invested in this way, and the paid-up capital appearing in the balance sheets of Sterling Rubber Companies working in Malaya is now nearer the actual capital invested than it once was. For the years prior to 1920, however, the percentage return revealed by the dividends declared is very considerably higher than the actual return on the total capital invested, and there are still numerous companies whose capital item is understated from this cause and the earnings overstated. On account of the complicated nature of the calculations involved no attempt has been made in the above tabulation to show the return on actual capital (including share premiums). The dividends declared have been taken simply at their face value and the table produced in response to a feeling that—pending the fuller statistical investigation of the Rubber Industry by some competent writer on economic subjects—there should be at least some record, however superficial, of the varying fortunes of the Industry.

The extent to which the issue of capital at a premium (tantamount to an immediate writing-down of the investment) has been practised in the Rubber Industry is little realised outside that Industry, and leads to a certain amount of misunderstanding.

The following are some examples :—

Consolidated Malay Estates, Ltd. : £75,000 paid-up capital and additional £72,328 received by way of premium on new issues. Not yet recapitalised.

Malacca Rubber Plantations : £525,000 paid-up capital and additional £575,000 received by way of share premiums. Not yet recapitalised. (One issue of £1 shares at £14 premium.)

Linggi Plantations, Ltd. : Paid-up capital, June, 1919, £115,000 ; Share Premiums account £351,822. Of this total £345,000 was recapitalised in 1919, bringing paid-up capital to £460,000. (One issue of new shares was made at 1400 per cent premium.)

The dividends which have been declared on the nominal paid-up capital of these companies are obviously unreliable as a guide to the return on actual capital invested. The majority of premium issues have, of course, been on a smaller scale, but in the aggregate they represent a large additional investment. The number of Sterling Companies with estates in Malaya, traceable in current works of reference as having made issues of shares at a premium is 123, and this

is a minimum figure. Much development has also been done out of revenue in the past and generally speaking the care of directors has been to reduce capitalisation per acre.

RUBBER RESEARCH WORK IN MALAYA.—The Agricultural Department (Straits Settlements and F.M.S.) maintains a division of agricultural chemistry, a staff of agricultural inspectors, an economic botanist with an assistant, a mycologist with two assistants, an entomologist with a small staff, a division of agricultural instruction, and a plant physiologist, etc., and in addition to administrative duties much research work is done. There are several Government experimental rubber plantations on which tapping, etc., experiments are carried out.

The Rubber Growers' Association has a scientific staff, consisting of a senior scientific officer, two mycologists, and one chemist.

The proposal to set up an Institute of Rubber Research to co-ordinate under Government auspices all Rubber Research work in the Malay Peninsula had already received promising support when a stop was put to all negotiations by the financial difficulties created by the fall in the price of rubber. With the considerable alteration for the better that has now occurred the negotiations have been resumed and it is hoped that an approved scheme will shortly be adopted. In this connection it may be mentioned that the Stevenson Committee (*vide* paragraph 15 of its first Report) recorded its opinion "that a substantial proportion of any additional revenue obtained (from the Export Duty on rubber) under the scheme should be specifically set aside and applied for the direct benefit of the Plantation Rubber Industry in such ways as scientific research, and the development of new uses for rubber."

RUBBER TREE DISEASES IN MALAYA.—Though diseases, such as Pink Disease and Mouldy Rot, are getting more universally spread throughout Malaya every year, as is only to be expected in such a universally distributed cultivation as rubber, yet, generally speaking, the incidence of such disease is less intense now than hitherto, and, above all, there is a keener appreciation of the danger of untreated diseases by planters at the present day than previously. With regard to these diseases, the results of which are very evident as soon as the trees are attacked (e.g. Pink Disease, Mouldy Rot, Black Thread), their treatment has, generally speaking, been little interfered with by the slump. The exceptions have been found practically only on native holdings, but this matter has been watched by the officers of the Department of Agriculture. The shortness of money has hindered some estates from carrying out certain works in preventing the spread of those less obvious, but still more insidious, diseases of rubber, such as root diseases. Still, as very little further land has been opened up under rubber during the slump period, and as it is at the early stage of the history of a field when the most effective work can be done in preventing the spread of root diseases, and as the results of such work when carried out in older rubber are largely problematical, then the real loss due to the failure in some cases to treat affected areas may not be really large. At the same time there is no desire in Malaya to minimise the importance of not neglecting the work connected with the prevention and treatment of diseases of the trees

on rubber estates, or to close the eyes to the menace which an uncontrolled outbreak of disease or pest could be to the Rubber-growing Industry as a whole in the Malay Peninsula, where rubber estates are practically contiguous from Kedah to Singapore.

STATE OF UPKEEP OF PLANTATIONS IN MALAYA.—Somewhat divergent opinions have been expressed as to the effect the slump has had on the state of upkeep of immature plantations and on the consumption of bark.

The official view as expressed at the end of 1922 by Mr. South, Director of Agricultural Inspection, is reassuring. In his opinion the area of bearing rubber permanently useless on estates is quite negligible. "On smallholdings the very heavy systems of tapping often employed will certainly result in a lack of tappable bark in one or two years' time, and a proportion of the trees will probably be useless. In addition there are areas of holdings scattered all over the country in which the trees are already nearly useless on account of bad tapping in the past combined with over-tapping recently. A certain small number of immature areas on estates are not in good condition, but the trees are there and are not yet suffering very severely. The use of cover crops to reduce weeding costs and of giant mimosa to destroy lalang are now well understood and should prevent any great increase at present in the area of immature estate rubber in a really badly neglected condition. The area of small holdings of immature rubber covered with lalang and blukar is considerable; on some the rubber trees have been destroyed by fire, and the same fate will attend others, but if the price of rubber improves the land will probably be cleaned up to some extent and the trees be tapped, as has been done on many smallholdings in the past. In fact, Malays nearly always leave their rubber holdings to look after themselves until the trees are tappable, even when conditions are prosperous. Certain areas of tappable rubber often owned by Chinese are untapped and abandoned, especially in parts of Pahang where tapping costs are high." On the whole, though it is very difficult to form an estimate, Mr. South doubts whether 50,000 acres of rubber have been destroyed and rendered permanently useless in Malaya. (Cf. statement, foot of page.)

NATIVE RUBBER PLANTATIONS IN MALAYA.—Complete statistics of the area under rubber on smallholdings in native possession are not available at the moment, but the total planted area on estates of less than 100 acres is 900,000 acres, and for practical purposes this may be taken as native rubber; the state of upkeep is partly indicated in the preceding paragraph. In many cases the plantations are free of weeds, but everywhere carelessly maintained. The trees are generally too closely planted and are severely overtapped, although here and there an improvement in the tapping can be observed. There is much high tapping, and numerous trees in the far advanced stages of Brown Bast can be considered as lost. It is difficult to say anything of the supplies of bark. From an official source, and with reserve, the following valuation was given during 1922 :—

"Seventy-five per cent of the trees can be tapped daily on a quarter of the circumference. Twenty-five per cent are worthless, or will become so shortly."

The upkeep of the immature area is neglected.

The native plantations vary greatly from 1 to 100 acres. Small gardens are tapped by the owner himself with his household, without taking account of work and time. On bigger properties outside tappers are employed in the mornings for a few hours, and these are paid with a share of the yield, or perhaps with a low wage, and for the remainder of the day are free to seek work elsewhere.

MANUFACTURE OF NATIVE RUBBER.—Methods of preparation of the rubber on native estates are in many cases extremely primitive. Coagulation in pans, rolling out by the hand, and allowing the rubber to dry out in the wind to 30 per cent moisture are practised. A more advanced type have got hand-rollers and hand-markers, and holders of more important plantations have even small smokehouses, and prepare their product direct for the market.

The "Kangsar" sheet—a flabby malodorous mass which has been either bottle-rolled or trampled under foot, and which usually contains 20 per cent or 30 per cent of water—is fairly typical of the crude form of rubber produced on small native holdings in Kuala Kangsar and the surrounding districts, and, indeed, throughout the Peninsula. On the other hand, the natives of the Batang Padang district of Perak can turn out a diamond pattern sheet of rubber of exceptionally fine quality.

The unsmoked native rubber is sold at very low prices to Chinese or native rubber-buying shops,¹ of which there are a dozen or more in all fair-sized villages and about a thousand in the Federated Malay States alone; it is sent by them to the reconditioning factories in the harbour towns. In Singapore alone there are fourteen or fifteen of these factories which receive their produce mainly from the Malay Peninsula, but also from British Borneo, Dutch Borneo, Palembang, Djambi, Siam, Burma, and Cochin China. The rubber arrives in the form of thick unsightly sheets, with a strong odour, and bound together by means of rattan. The average moisture content is 30 per cent. This mass is purified in the crêpe mills, and finally turned out in the form of blanket crêpe in about four grades: one of these factories operates no less than ninety crêpe mills.

ORGANISATION OF NATIVE RUBBER PRODUCTION ON CO-OPERATIVE LINES.—Hopes are entertained that the connected problems of improving the quality of native rubber output, securing better tapping and plant sanitation conditions on estates, and ensuring the native a fair price for his rubber, will be found capable of solution on co-operative lines.

Encouraged by the success which the Co-operative Movement has obtained in India, Siam, and other countries, the Federated Malay States Government recently decided to introduce the system into their territory, and passed a law for the constitution and control of co-operative societies. This law came into force on July 1st, 1922. The movement has thus not been long in operation, and it is impossible to say much about it or its future developments at this early stage. An excellent start has, however, been made, and it is safe to predict

¹ The Chinese-owned shops are principally agents or representatives of the bigger merchants or reconditioning factories in the larger towns. It is believed locally that they form buying rings and working agreements amongst themselves as to prices.

that the movement will take deep root in the country and spread in process of time throughout the rest of British Malaya, i.e. to the Colony of the Straits Settlements and to the different Unfederated Malay States. The co-operative system is meant to benefit everybody—not merely native rubber growers, but all sections of the community. The preamble of the Federated Malay States enactment proves this. It runs as follows: "Whereas it is expedient to encourage thrift, self-help, and co-operation amongst agriculturalists, artisans, and other persons with needs in common, and for that purpose to provide for the constitution and control of co-operative societies, etc." Under this law persons who wish to benefit are required to organise themselves into "A society which has as its object the promotion of the economic interests of its members in accordance with co-operative principles." These words are most important as they are the legal definition of a co-operative society.

The Malays and Chinese are imbued from birth with the co-operative spirit. In their industrial and agricultural pursuits both races work to a large extent on co-operative lines. The degree to which the co-operative system will develop amongst the Malay and Chinese rubber growers will depend on the rapidity with which both races assimilate the principles, the practice, and the technique of the co-operative system which is being taught to them now in certain areas by officers of the Co-operative Department, and also to a very large extent on the quality, quantity, and capacity of their instructors.

Before the co-operative production and marketing of rubber by native smallholders can be carried out on any extensive scale, a good deal of spade-work will have to be done. This is in hand now. Native organisers will have to be trained in the principles and practice of co-operation. This has already been done in the case of a few Malay officers who are at present at work in certain districts of Perak, Selangor, and Negri Sembilan. These officers are making an economic survey of the country—that is to say, ascertaining exactly how the various native industries (not merely rubber growing but agricultural produce generally) are carried on in the different villages and districts and how improvements can be effected. The officers of the Co-operative Department are busy organising meetings of the peasants, forming them into societies, and teaching them the utility of thrift, of a proper system of accounts and elementary book-keeping, and improved methods of buying their supplies and selling their products. At the same time the officers of the Agricultural Department, with whom the former work in close co-operation, are pointing out to the peasants improved methods of cultivation; in a word, the co-operative official deals with the economic, financial, and marketing side of agriculture, whilst the officer in the Agricultural Department confines himself mainly to the scientific and technical side. The peasants—Malays, Chinese, and others—seem most anxious to form themselves into co-operative societies, and to learn a new system of better farming, better business, and better living. A certain number of societies has been organised among the Malay *padi* planters in the Krian district of Perak. These peasants also own in addition to their rice fields a certain amount of rubber.

The powers that be are fully alive to the necessity of encouraging the resident

native population to cultivate tropical products other than rubber, particularly food-stuffs. The shortage of rice not so long ago, which more than doubled its price and also coincided with a heavy fall in rubber, has roused the public conscience to the dangers of Malaya being dependent for subsistence on one or even two products, such as tin and rubber, and has done much to revive the *padi* (rice) planting industry amongst the Malays and to induce people generally to investigate new and additional sources of livelihood.

It will be some time before the economic survey of the country referred to above will be complete. As co-operative societies are formed, a full and complete inventory is usually made of all the property, movable and immovable, belonging to the members. This is periodically revised and kept up to date. Fairly accurate statistics will therefore be available in the near future of the amount of rubber owned by members of co-operative societies. One of the main tasks awaiting the officers of the Co-operative Department is to teach the natives to produce an improved article of better quality and grade. The members of one particular society near Taiping were considering the purchase of machinery and the erection of a smokehouse with a view to the production of a better grade rubber.

The Government officers in the short time that they have been at work have been doing their best to organise the native rubber growers on co-operative lines. More rapid progress would be made if the principal Europeans engaged in the Industry took a hand in the task. Much might be done, for instance, by the European managers and planters who lived and worked near native rubber holdings. There are already signs of steps being taken in this direction. It would be better still if the members of the Rubber Growers' Association endeavoured to draw all sections of the Industry, both European and Asiatic, together, so that they might all work on uniform lines with a uniform policy. The sooner the Industry is organised on co-operative lines the better will it be for all concerned.

INLAND TRANSPORT.—British Malaya possesses an excellent road system of about three thousand miles, and good railway facilities. A great work just completed is the joining of Singapore Island to the mainland by means of a causeway over which trains now run. The main trunk road down the length of the Peninsula runs from Prai (on the mainland opposite Penang) to Singapore. North of Prai this peninsula trunk road will ultimately connect with Perlis and the Siamese boundary. Large sections of this northern extension have already been completed, Port Swettenham on the west coast and Kuantan on the east coast are now connected by a main road, which, after crossing the main range into Pahang, passes through many miles of uninhabited primeval forest. Lower down the Peninsula, another and much shorter west to east road is under construction to connect Batu Pahat on the west coast with Mersing on the east coast. This 88 miles of road will be entirely in Johore territory.

Revised rates for the conveyance of rubber by rail came into force on the 15th February, 1923. The feature is the great reduction given on consignments of five tons and over on long distances. The Railway Department have no objection to several estates combining to make up lots to exceed five tons, and

forwarding as from one consignor. The rate on five tons of rubber from Kuala Lumpur station to Singapore (Pulau Saigon) is \$101/64, against \$124/16 prior to the reduction.

SINGAPORE RUBBER MARKET.—Important rubber auction sales are held weekly at Singapore under the rules and regulations of the Singapore Chamber of Commerce Rubber Association (Chartered Bank Buildings, Singapore). The total quantities sold in recent years have been :—

	1913	1918	1919	1920	1921	1922	1923 (first 6 m'ths.)
Tons	1,508	31,665	35,100	26,545	24,660	24,324	7,442

The market gained greatly in importance during the War. There is a Standard Qualities Committee, and an arbitration panel (whose awards are accepted by the London raw rubber trade). The rules and by-laws of the Rubber Association are at present undergoing revision.

LABOUR IN MALAYA.—Rubber estate labour in Malaya is provided by Indians and Chinese, and smaller numbers of Malays and Javanese. At the last census (1921) the total estate population of British Malaya on 1350 plantations was 372,709. The Federated Malay States, with 901 estates, had 236,647 of this total; the Straits Settlements, 44,230; Johore, 44,633, etc. In the Federated Malay States the above total comprised 186,550 Indians, 33,135 Chinese, 13,933 Malays, 351 Eurasians, 2209 Europeans, and 469 of other races. In the Straits Settlements about a similar proportion between the different races was maintained, but in Johore, Kedah, Kelantan, and Trengganu there were many more Chinese than Indians, and also a larger proportion of Malays.

Figures obtained at the end of 1922 show some decrease on these totals, the estate population in the Federated Malay States standing at that time at 167,259, including 130,190 Indians, 27,829 Chinese, 4922 Javanese, and 4318 others, while the estate population of the Straits Settlements had dropped to 28,315. The reduction was due to the return of coolies to their native countries on account of the slump. The immigration and emigration statistics for the first ten months of 1923 indicate arrivals approximately equal to departures, so that the situation evidently remains as it was in 1922. The immense importance of the Indian labourer to the prosperity of Malaya has always been recognised by the Government, and the conditions of service of the coolies has been jealously protected by the Indian Immigration Department. The recruiting of the labourer in his own country is under the supervision of an officer of the Federated Malay States Government stationed in Madras, and from the moment of the labourer's arrival at Penang or Port Swettenham his interests are the immediate care of the Department, by whose officers the rights of coolies at the hands of their employers are rigorously enforced. Planters themselves, too, with the knowledge that labour is hard to get and not always easy to keep, do their utmost to make the immigrants' existence in Malaya a healthy, profitable, and, according to his own standard, a comfortable one, if only in order that the returning coolie may give the estate a good name amongst his fellow-countrymen, and the stream of new emigrants from Southern India may continue

to flow. The Government of India is fully cognisant of the satisfactory conditions under which Indian labour works in Malaya, conditions which have been studied by their own officers and most favourably reported on. Recently, however, stringent legislation has been enacted in India controlling emigration of Indian labourers to other parts of the British Empire. To provide for the new requirements of the Government of India the whole Labour Code of the Federated Malay States and Straits Settlements—already twelve times amended since its passage in 1912—has been scrapped, and the new Labour Code framed and passed (in August, 1923). The majority of the Indian Government's stipulations were already incorporated in the old code—abolition of imprisonment for labour offences, for example. The minutest interests of the labourers are now safeguarded by law. Fines (which were a substitute for imprisonment) for labour offences are also done away with.

In deference to the wishes of the Government of India, it has even been found necessary to substitute the phrase "wrongful determination of agreement or contract," for the original words "desertion or malingering." Indian child labour under ten years of age is prohibited. The employer on whose estate there are ten or more children of any one race between the ages of seven and fourteen must provide a school for these children and such teachers as the Controller of Labour determines. On an estate where there are more than fifty female labourers, the employer must provide a nursery for infants under the age of three, and has also to provide nurses to take charge of them; and to furnish free supplies of milk and rice. Provision is also made for maternity allowances. Finally, standard wages for male labourers over the age of sixteen, and for female labourers over the age of fifteen, may be fixed by the Indian Immigration Committee. All the Indian labour employed throughout the Federated Malay States is free. Labourers are landed free of debt, and are at liberty to leave their employment at any time.¹

Further, no Indian immigrant can enter into any written contract to serve as a labourer. The death-rate among Indian labour on estates was 17·71 per 1000 on an average population of 123,849, as against 19·68 in 1921. Chinese immigration into British Malaya has just been the subject of a report by a Special Committee on Chinese Labour. As a result, a permanent Chinese Labour Advisory Committee in respect of Negri Sembilan, Johore, and Malacca has been appointed by the Governments of the Federated Malay States and the Straits Settlements: (1) To propound a scheme for the licensing of recruiters of Chinese labourers, and (2) to make recommendations in the matter of appointing a Government Labour Agent in China.

By no means all, or even any very large proportion, of the total number of Chinese immigrants into Malaya are employed on the rubber estates, but on most estates there is a small percentage of Chinese, and in some districts work is done almost entirely by them. The Chinese are valued for their great capacity for work, but strict discipline is necessary to keep them in harness. The number arriving by sea from China in 1922 showed a decrease of 30 per

¹ The number of Indian labourers reported as having left estates without notice during 1922 amounted to 36,992, as compared with 42,164 in 1921.

cent compared with the previous year. The Javanese are also regarded as good workmen and good tappers, but rather exacting. An interesting development of the last year or two in connection with labour is the introduction of contract tapping by gangs of coolies supervised by a Chinese contractor. To sum up with regard to labour, the general situation is that the supply is sufficient for the present demand, limited as it is by the introduction of regulation of rubber exports. A few days after the Export Regulation Enactments were passed an appeal was issued by the Planters' Association of Malaya to all directors, secretaries, and agents of estates asking them not to endeavour falsely to economise by reducing the labour force. Fortunately, estate labour forces have been conserved, the higher price obtained for the production of rubber having enabled estates to employ any surplus labour not required for tapping on disease and pests and cultivation work.

A Central Labour Advisory Committee—the objects of which are: (a) To collect statistics and other information relating to labour; (b) generally to enquire into and advise upon all matters pertaining to labour and to the recruitment thereof—has also lately been inaugurated by the Planters' Association of Malaya.

CHAPTER III

GEOGRAPHICAL SURVEY: RUBBER (*continued*)

2. THE RAW RUBBER INDUSTRY OF CEYLON

[Statements and notes revised to January, 1924; annual statistics to December 31st, 1923.] •

Planted Acreage in Ceylon. Resting and Heavy Yielding Periods. Yield per Acre. Financial Results of Ceylon Rubber Companies. Ceylon Rubber Research Scheme. Quality and Preparation. Colombo Rubber Market. Exports of Rubber from Ceylon. Freight Rates, Export Duty and Shipping, etc., Charges. Estate Labour Situation.

IF the various Malay States and the Colony of the Straits Settlements be considered as one country making up British Malaya, Ceylon is then the second rubber-producing country in the British Empire in order of importance. The Para rubber tree was introduced in 1876 and the original plantation made with plants received from Kew and planted out at Heneratgoda Botanic Gardens can still be seen. From these trees a large proportion of the rubber in the East is descended; some of them have attained a large size and one has given extraordinarily high yields.

PLANTED ACREAGE.—The total area under cultivation with rubber in Ceylon is now about 404,000 acres (including 90,000 acres of smallholdings and native-owned rubber) and about 390,000 acres are believed to have reached the bearing

stage. The principal rubber growing districts are Kalutara (21.1 per cent of the total area under rubber), the Kelani Valley and Sabaragamuwa, though the cultivation is also successful in Kandy, Matale, Galle, and other districts.

RESTING AND HEAVY YIELDING PERIODS.—In Ceylon the tree is usually rested for about one month during the period of leaf-fall, from about 15th February to 15th March, tapping operations being suspended during this time. The freest flow of latex occurs during the north-east monsoon, 60 per cent of the year's yield being obtained under ordinary circumstances in the latter half of the year.

YIELD PER ACRE IN CEYLON.—The following is the official record by the Rubber Growers' Association from reports made by ninety-three of its members' estates in Ceylon, of the average yield per acre of rubber on these estates :—

RUBBER YIELDS PER ACRE IN CEYLON				
	Average per acre in bearing, lb.	Highest per acre. lb.	Percentage first latex	Average rainfall in inches.
1915	248	408	84.48	152
1916	253	585	85.14	152
1917	312	521	85.04	135

Average age of trees in 1917 = 9½ years.

The reason why the comparison has not been carried beyond 1917 was explained when corresponding statistics were presented for Malaya.

It is worth noting that the higher yields in Ceylon in 1917 were all obtained on a system of alternate daily tapping, one cut on one-half or one-third of the circumference, as against the daily tapping practised during the same period in Malaya.

FINANCIAL RESULTS OF CEYLON RUBBER COMPANIES.—The following tables show the financial results of all the Ceylon Rubber Companies of which particulars can be traced. Results of Ceylon Companies owning properties on which both rubber and tea are cultivated will be found in the Tea Section (pp. 154-155) :—

CEYLON RUPEE RUBBER COMPANIES (LANDS IN CEYLON)

	1911	1912	1913	1914	1915	1916	1917	1918	1919	1920	1921	1922
Average Ordinary Dividend per cent . . .	28.33	42.58	27.46	20.83	38.53	34.79	29.94	21.12	22.37	4.65	7.49	13.53
No. of Companies contributing to Average . . .	24	28	33	43	44	48	50	54	54	54	56	47
Non-Dividend Payers . . .	24	28	33	43	44	48	50	54	54	54	56	47

CEYLON STERLING RUBBER COMPANIES

	1910	1911	1912	1913	1914	1915	1916	1917	1918	1919	1920	1921	1922
Average Ordinary Dividend per cent . . .	7.86	11.35	14.64	8.80	9.80	18.70	19.14	13.30	10.1	16.48	1.16	1.60	5.90
No. of Companies contributing to Average . . .	24	26	28	28	28	28	28	28	28	28	28	28	28
Non-Dividend Payers . . .	24	26	28	28	28	28	28	28	28	28	28	28	28

Grand Average Annual Dividend 13 years = 10.68 per cent. Last 5 years = 7.05 per cent.

Many Ceylon Companies were fortunate during the slump in having sold forward a portion of their production at pre-slump prices, and Ceylon as a whole enjoys lower costs of production than any other rubber-growing country without exception, the average of fifty-seven Sterling Companies during 1922 having been 7·92d. per lb. (Previous averages: 1921, 8·88d.—33 Companies; 1920, 1s. 5·8d.—29 Companies; 1919, 1s. 4·19d.—30 Companies.)

The showing made by the Rupee Companies is remarkably good; still during 1920–21, 1921–22, and the early part of 1922–23 the great majority of the Ceylon Rubber Companies worked at a loss or without profit.

The “grand average annual dividend” as calculated for Sterling Companies is, of course, for the period of years included in the table and takes no account of the long waiting period during which no profit was earned. Qualifications applied to the statement of the financial results of Rubber Companies in Malaya (on p. 68) apply equally to this table.

CEYLON RUBBER RESEARCH SCHEME.—From 1909 to 1915 a research organisation was maintained by means of a fund guaranteed by certain Companies who were members of the Rubber Growers’ Association. In 1915 this organisation was merged into the Rubber Growers’ Association itself and became an integral part of that body. A laboratory was established on Culloden Estate, Neboda, and a chemist and a mycologist were employed.

In addition, a research organisation for the improvement of plantation rubber was established in 1913 by the Ceylon Government in co-operation with the Imperial Institute and in conjunction with a number of planting companies in the Colony, the general supervision being vested in committees in Ceylon and in London. This organisation employed a chemist in Ceylon and maintained a fully equipped rubber-testing plant at the Imperial Institute, London. The existence of these two schemes involved some duplication of investigations, and in 1920 arrangements were made for their amalgamation. Under the new scheme, representatives of the Rubber Growers’ Association have been added to the Committee appointed by the Government of Ceylon to administer the scheme in the Colony, and also to the London Committee, which advises as to the work carried out at the Imperial Institute. The Rubber Growers’ Association handed over their bungalow and laboratory situated on Culloden Estate and undertook to subscribe the same annual sum as it had expended on its own organisation. The London Committee includes a representative of the Research Association of British Rubber and Tyre Manufacturers, with whom co-operation has been arranged in dealing with questions relating to raw rubber which require investigation, and also several representatives of rubber manufacturing companies. The funds for carrying on the scheme are provided by contributions from the Ceylon Government and the Rubber Growers’ Association, and by subscriptions from planters and others connected with the Rubber Industry in the Colony who are not members of the Rubber Growers’ Association. The contributions made by the Government of Ceylon (partly from proceeds of the export duty on rubber) is a grant-in-aid of the basis of 60 : 40 of the subscriptions made by the Rubber Growers’ Association and local members of the Rubber Research Scheme. The staff in Ceylon

consists of a chemist, a mycologist, a physiological botanist, and a secretary and travelling inspector, and that for the chemical and vulcanization investigations at the Imperial Institute includes a superintendent, two assistants and a mechanic.

It is not too much to say that rubber research work has, in the past, led to considerable improvements in methods of preparation of rubber, and has done a great service in drawing attention to the diseases and pests which affect plantations. It is also generally agreed that such research work is necessary to-day if progress is to be maintained and the health of estates is to be adequately safeguarded. At the end of 1922 the Rubber Research Scheme had a membership of approximately 44 per cent of the acreage planted with rubber in Ceylon, but the membership showed a substantial advance during 1923, and the proportion of acreage contributing to the scheme must now be much higher.

As evidence of the scope of the Scheme the subjects of investigation in Ceylon may be mentioned :—

1. Chemist : (a) Preservation of latex for shipment (in progress) ; (b) prevention of mould by disinfection ; (c) study of the disinfectant action of smoke ; (d) study of the effect of heat on latex ; (e) study of the mineral constituents of latex ; (f) study of the rust on sheet (completed) ; (g) study of the formation of resin in rubber ; (h) study of the coagulation of latex ; (i) preparation of samples of rubber to be tested at the Imperial Institute (in progress).

2. Mycologist : (a) Study of pod disease and leaf-fall (in progress) ; (b) collection of data as to the incidence of pod disease in different districts and on different estates (in progress) ; (c) study of bark diseases with a view to determining if different causes are operative (in progress) ; (d) study of methods of treatment of bark diseases ; (e) the penetration of bark by various disinfectants (completed) ; (f) to determine the most effective disinfectant.

Physiological Botanist : (a) Examination of bark of individual trees of known parentage (in progress) ; (b) a study of the individuality of yields of trees in a plantation (in progress) ; (c) budding of rubber ; (d) a study of virgin and renewed bark to determine the connection between the latex tubes of each ; (e) a study of Brown Bast (in progress) ; (f) the effect, if any, of fertilisers on the rubber content of latex ; (g) a study of the development of the cork cambium in *Hevea* and of the disappearance of rubber from the outer bark.

At the London head-quarters (The Imperial Institute) the questions investigated have included : (1) the amount of variation shown by rubbers prepared by a standard method—(a) from trees of different ages ; (b) from different estates ; and (c) at different seasons of the year. (2) The effect of different methods of preparing the raw rubber, e.g. different methods of coagulation ; the addition of preservatives to the latex ; the dilution of the latex before coagulation ; the form of the rubber (sheet, crêpe, block, etc.) ; various methods of drying, including smoking ; the characters of moisse rubber, etc. (3) The cause of the inferior mechanical properties of scrap rubbers ; and (4) the suitability of plantation rubber for special manufacturing purposes. Important investigations have also been carried out on the influences of the constituents

of raw rubber, other than caoutchouc, on vulcanization ; on methods of testing raw rubber ; and on other related problems.

These experiments have furnished valuable results regarding the properties of plantation rubber. A detailed programme for further work in London, based on the results already obtained, has been drawn up, and series of samples for the investigations it is proposed to carry out are now being prepared in Ceylon.

QUALITY AND PREPARATION OF RUBBER.—Though the now almost universal practice of bulking in conjunction with standardised coagulation has done much to improve the uniformity of finished rubber, it is very evident that there is still room for improvement in this respect, which can only be effected by more generous factory equipment, together with better facilities for transport of latex and/or coagulum, it being the rule that factories which put their day's work through in the shortest time make the most uniform rubber. Scarcity and increasing prices of fuel, combined with high-drying machinery upkeep costs, are inducing numerous estates to resort to air drying, mostly with satisfactory results. Market valuations continue to be governed by external appearances only for want of some more accurate method of gauging the intrinsic vulcanising qualities required by the manufacturer, and in consequence many rubbers, though perfectly pure and physically sound, are heavily penalised for the slightest falling off in the pale translucent amber so much sought after by dealers, and which is instantly lost in the manufacturers' mixing machinery.

A mystery still unsolved is the necessity for Ceylon crêpe having to be rolled up into blanket form, whilst the Federated Malay States product is marketable in the shape of lace. Ceylon was the pioneer country in the manufacture of "Sole crêpe" (for soles of boots and shoes).

The Ceylon standard grades as recognised by the Colombo Rubber Traders' Association are

Ceylon Standard First Latex Crêpe,
Ceylon Standard Ribbed Smoked Sheet.

Incidentally it may be mentioned that most of the Ceylon rubber is made up in the former form. The official requirements for each grade are :—

Ceylon Standard First Latex Crêpe shall be well prepared dry rubber of good quality, of even pale colour and free from all stains, spots or traces of oxidation.

Ceylon Standard Ribbed Smoked Sheet shall be clean, tough rubber, free from mould, rust, dampness, under or over-smoked sheets and not massed. Slight traces of air bubbles may be allowed subject to the discretion of the Standard Qualities Committee.

The Standard Qualities Committee of the Association (composed of an equal number of sellers and buyers) sits once a week (or as and when necessary) for the purposes of examining samples submitted¹ to them and to establish whether they come up to these standards. Lots of a mixed character (from various estates) bulked in one parcel are not adjudicated on for standard quality, and in all cases estate names must be divulged. Awards are signed and sealed and remain in force for a period of sixteen running days from the date of award. All

¹ Only members of the Colombo Rubber Traders' Association may submit samples for award.

rubber sold as standard quality must be certified by the Standard Qualities Committee before tender, and the sellers must be in a position to deliver the rubber at the time the tender is made.

COLOMBO RUBBER MARKET.—Colombo possesses a flourishing local rubber market, though the transactions effected are not so important as those of the Singapore rubber market. The quantities offered at the weekly public auctions during 1922 averaged about 400 tons, and in addition there was a large quantity of rubber dealt with under forward contracts and a considerable quantity by private treaty; a growing inclination is said to be manifest on the part of some rubber estate managing agents to avail themselves of this last-named method of disposing of their No. 1 grades.

The following table shows the quantities offered at the local auctions in recent years :—

	Offered. Tons.	Average price realised. Rs. cents.
1919	16,932	1 00
1920	16,106	0 70
1921	16,689	0 43
1922	17,947	53·60
1923	14,640	

One of the differences between sale in auction and private sale is that in the former case it is sold on sample only—description as having received Standard Quality award being expressly barred. The auctions are held weekly, on Thursdays, at the Ceylon Chamber of Commerce Sale Rooms, rubber being sold by the lot at so much per lb. ex warehouse or store, Colombo, in good merchantable cases. No less advance than 1 cent per lb. may be made on any previous bid except when the price of either Standard Grade is under 75 cents per lb., in which case the minimum advance is half a cent per lb. Brokers buying or selling rubber declare in writing their principals immediately after the sale, otherwise they are themselves held responsible as principals. All rubber must be ready for inspection immediately after the sale, and be paid for on catalogued weights on or before prompt day, viz. five days from date of sale (Sundays and Bank Holidays excepted). No rubber may be put up for sale at the Ceylon Chamber of Commerce Sale Rooms except by members of the Ceylon Chamber of Commerce, the Colombo Rubber Trading Association or the Colombo Brokers' Association as principals, with the exception of rubber that is guaranteed by the selling broker as being on Garden Account.

In all forward contracts for rubber, whether made on sample or description for a specific delivery, or shipment, the rubber when tendered must be in sound order and condition. Unless otherwise provided in the contract, tender must be made not less than six clear working days before the end of month of delivery, and buyers must take delivery within ten running days of receipt of tender. There are the usual provisions for arbitration, etc., and a panel of rubber arbitrators is appointed annually.

EXPORTS OF RUBBER FROM CEYLON.—The exports in 1922 created a record which the operation of restriction has prevented 1923 from exceeding. Restriction

tion was only in force for two months of the year and did not affect shipment of stocks. The following table shows the distribution of Ceylon-produced rubber during the years 1921 and 1922; the shipments of imported rubber also amounted to a considerable figure annually (2361 tons in 1922) and these go principally to U.S.A.

EXPORTS OF LOCALLY PRODUCED RUBBER FROM CEYLON.

	1921 Tons.	1922 Tons.	1923 Tons.
To United Kingdom	13,262	9,811	9,892
„ Canada	337	412	251
„ Australia	144	593	74
„ U.S.A.	23,717	33,828	24,510
„ Continent	2,600	2,614	2,121
„ Japan	146	95	167
„ Other Countries	4	4	97
	40,210	47,357	37,112

These figures are based on the Ceylon Chamber of Commerce Returns, which are locally preferred to the official returns which give the total as 46,694 tons in 1922 and 39,341 tons in 1921—a small difference in any case. The reason for the difference appears to be that the Chamber of Commerce only enters exports as vessels leave, while the Customs records the daily shipment to loading vessels.

It will be seen that the United States is by far the largest buyer of rubber from Ceylon. The shipments to the Continent consist largely of lower grades and during 1921 and 1922 Germany took about four-fifths of this quantity, the rest being divided between France, Holland, Italy, and Belgium. In 1923, however, exports to Germany showed a heavy reduction, amounting to only 712 tons against 1,935 tons in 1922, while France took 629 tons, about treble the amount shipped there in 1922. Italy, Belgium, Holland, and Sweden also took much larger quantities, the first-named double, the second four times, and the third 40 per cent. more than in 1922.

It must be borne in mind that in 1921 voluntary restriction of 25 per cent was in force for over six months. It will, therefore, perhaps be safe to assume that the 1922 shipments are the most reliable guide to Ceylon's present producing capacity—in the absence of restriction—the intensive tapping in October of that year having compensated for the restriction imposed in November and December.

FREIGHT RATES, EXPORT DUTY AND SHIPPING, ETC., CHARGES.—Freights to the U. K. were raised from 47s. 6d. to 52s. 6d. (the present rate) in February, 1923. The rate to America (direct) is now (February, 1924) 30s. net. To Fremantle, Adelaide, Melbourne, and Sydney the rate is 40s., measurement is 50 feet, or 20 cwt. at ship's option. Rubber latex in cylindrical packages is charged 45s. to the United Kingdom (20 cwt.). The wharfage companies have recently introduced (May, 1923) a rate of 9 cents per 100 lb. to cover port shipping charges. Export duty was reduced from Rs.3 to Rs.2.50 per 100 lb. on

the 25th August, 1922. A calculation of the effect of freight, shipping, and landing charges and export duty between Colombo and London at the end of December, 1922, gave the total of 1.51d. per lb. as the difference between the cost of rubber in Colombo and in London, but the higher freight rate has since increased this slightly.

THE ESTATE LABOUR SITUATION.—The labour situation for rubber, tea, cacao, etc., estates does not differ materially, and, indeed, these cultivations are often carried on together. It will, therefore, be convenient to review the leading facts once only and so avoid unnecessary repetition in the different sections.

Estate labour may be divided into two kinds: immigrant and indigenous. About 85 per cent of the estate labour consists of immigrant Indian Tamils recruited from India. These coolies are housed on the estates and form resident labour forces, supervised generally by a European Superintendent, with the assistance of native conductors and kanganies.

On many estates the labour is almost wholly immigrant, particularly on the up-country tea estates. In the low-country, the immigrant labour is supplemented or even replaced by indigenous coolies, mostly Sinhalese. The proportion of immigrant and indigenous labour on estates may thus vary from cases where the labour is exclusively immigrant to those in which it is wholly indigenous.

The indigenous labour, in general, differs chiefly from the immigrant labour, in that it is not resident. The Sinhalese, who form most of the indigenous labourers, are usually drawn from the villages surrounding the estate, but they continue to live in the villages. They are consequently less amenable to estate discipline, and, having other interests and, possibly, other means of livelihood, Sinhalese labour is often less regular in attendance, and less dependable than the Tamil. But excellent results are frequently obtained with indigenous labour, particularly if it is made resident.

As the estate labourer is generally an immigrant, the chief connotation of "labour" in Ceylon is the immigrant estate labourer, or estate Tamil coolie, and related to him, and the condition of his service, controversy has been raging for a considerable time. The chief difficulty was the question of the coolie's indebtedness, which had been allowed to increase by the practice of giving advances. It is hoped that a settlement has now been reached by a recent Ordinance which took effect at the end of 1921 and has materially altered the law in this respect. Formerly it was a penal offence for a coolie to break his contract of service and "bolt"; and by means of the *tundu* the indebtedness of a coolie to any estate was transferred to any other estate on which he went to work. Now the penal clauses governing the relations of employer and employed have been abolished, and so has the *tundu*. An estate coolie now on quitting any service receives a discharge certificate, and is free to go to any other estate.

An elaborate and efficient system has been developed to control and facilitate coolie immigration. Each estate pays a cess, and the funds go to maintain a staff of one Commissioner, one Deputy Commissioner, and a number of Assistant Labour Commissioners and Labour Commission Agents. The whole of this staff is located in India, and labour recruited by "Kanganies" from

Ceylon is forwarded to the estates through the Labour Commission Agencies, the Central Station at Trichinopoly, and the Mandapam Camp. The coolies are sent direct to their estates by rail, tin tickets being provided them as vouchers for their expenses en route, the cost being afterwards collected from the estates.

The cost of administering the Ceylon Labour Commission during 1922 amounted to about Rs.222,000 for the year, as against an estimate of Rs.237,500. This was Rs.2.86 per coolie despatched, the total number being 77,636 against 100,000 in 1921 and 97,863 in 1920. Of course, there is a constant return flow, but the fact that nearly half the number despatched in 1922 were old coolies returning to Ceylon shows that employment in the Colony is popular. On arrival at the estate the coolie is housed free of charge, and is fed at a rate often very much below cost. Much attention is given to sanitation; mothers and infants are particularly carefully attended to; nearly every important estate has its own dispensary, while there are Government hospitals in all the important planting areas. Considerable attention is also given to the education of the children, estate schools being now widely established. On a large number of tea and rubber estates the children of non-working age are provided with one free meal a day. On the whole, the coolie is very well cared for, and large sums are spent annually on his maintenance.

The most costly item of this maintenance has recently been rice. Even when the price rose 100 per cent, many estates still continued to supply it to the coolies at the old rate, the reason being that the balance of the coolies' budget must not be disturbed if an estate is to have a happy, contented labour force. In 1919 this entailed a loss to Ceylon estates of about twenty-five million rupees. Towards the end of 1920 the cost fell to nearly its old figure, but rose again during the crisis in 1921.

The rate of wages for estate labour vary greatly according to earning capacity and owing to different methods of payment. Some little time ago rough limits were 33 to 75 rupee cents per day. Non-estate labour was in general paid more, as rice was not supplied at a reduced rate. Native clerks are paid about Rs.30 a month as beginners; trained and efficient men may draw Rs.200 per month or over.

During 1922 the amount of labour unrest owing to the revolutionary changes brought about by the new Ordinance was considerable, but perhaps less than had been feared. In 1923 the situation became calmer and it looks as if the temporary disorganisation of the existing labour force will be amply compensated by the stimulus given to recruiting, for which the prospects were never brighter. Under the new circumstances rates of pay naturally show a marked tendency to advance. Apart from the greater freedom given to the coolie to change his master, there is the effect of another recent piece of legislation, the Indian Emigration Act, 1922, notification under which, among other things, provides that :—

“ The emigrant shall not, before leaving British India, have entered into a contract of service for a period exceeding one month.

“ Any contract of service for a period exceeding one month entered into by an emigrant shall be void.

“ No part of the cost of his recruitment, subsistence during transport, or transport

shall be recoverable from any emigrant, and all expenses in this connection shall be defrayed from a common fund, to be raised in such manner and managed by such agency as may appear suitable to the Colonial Government.

"Within one year of his arrival in Ceylon an emigrant who has been assisted to emigrate at the cost of the common fund shall, on satisfying the Agent appointed under section 7 of the Act, that his return to his home is desirable either on the ground of the state of his health, or on the ground that the work which he is required to do is unsuitable to his capacity, or that he has been unjustly treated by his employer, or for any other sufficient reason, *be repatriated free of cost to the place of recruitment*, and the cost of such repatriation shall be defrayed by the Government of Ceylon, or the Ceylon Planters' Association."

To sum up, the total population of Ceylon, as enumerated at the census of 1921, amounted to about 4,504,000 persons. Of these, about 569,000 were enumerated on 2350 estates planted chiefly with tea, rubber, coco-nuts, or cacao. This estate population consisted mainly of Indian Tamils, who numbered about 494,000, equal to 87 per cent of the total. The rest included :—

Other Indians	9,000
Sinhalese	55,000
Europeans	2,700
Other Races	8,300

As the migration between India and Ceylon estates has been going on continuously from 1840 or earlier, considerable numbers of the Indian Tamils on estates regard themselves as domiciled in Ceylon. In 1921, about 34 per cent of them were returned as born in Ceylon; the proportion of females among them—482 per 1000 of the total population—shows a high figure for an immigrant population; while the number of Indian Tamil children under ten amounted to 236 per 1000, also quite a high figure. But, at the same time, active immigration continues to take place between Ceylon and India. The average annual immigration of estate labourers from India to Ceylon in 1911 to 1920 is reported to be about 87,000; while conversely they are perfectly free to return to India, and large numbers—at least 75,000 annually—take advantage of the proximity of Ceylon to India to return to their houses, often on a temporary visit, after which they go back to their estates in Ceylon. This intercourse with India is encouraged by the Ceylon planters, and labourers who consider themselves as temporarily domiciled in Ceylon, can keep in touch with their homes in India. The many difficulties with which they have to contend in their own country are not present in Ceylon; facilities are provided for the education of their children; questions of caste do not arise; there is easy access for them by rail and road throughout the Colony; sanitary and healthy habitations are freely provided for them under constant supervision by the medical authorities; they are allowed to own land or construct houses for residential purposes in any part of the towns or country under identically the same conditions as any other subjects of His Majesty. There are not a few cases where descendants of estate labourers have risen to influential positions in the professional classes of the Colony, and others have become owners of valuable tea estates.

CHAPTER IV

GEOGRAPHICAL SURVEY : RUBBER (*continued*)

3. THE RAW RUBBER INDUSTRY OF INDIA

[Statements and data revised to January, 1924 ; annual statistics complete 1922-23.]

History and Cultivation. Acreage under Rubber in India. Production and Yield per Acre. Reason of Low Average Yield in S. India. Labour. Dividend-Earning Record of Indian Rubber Industry.—Rubber in Burma : Yields. Tree Diseases. Exports of Rubber from India and Stocks. Voluntary Regulation of Exports.

HISTORY OF CULTIVATION.—Though a number of rubber-yielding trees are indigenous to Indian forests, they are not sufficiently abundant to justify exploitation, and, apart from two plantations in Assam under *Ficus elastica*, the spasmodic efforts made to grow rubber on a commercial scale never got beyond the experimental stage before 1900. The cultivation is now practically confined to Southern India and the Tenasserim Coast of Burma. In Travancore, the Shencottah and Mundakayam districts and the Rani Valley are the chief centres of the Industry, the pioneer estate on the Periyar River at Thattakad having been opened up in 1902 with Para rubber (*Hevea brasiliensis*). In the last twenty years a great deal of planting, particularly in Travancore and Cochin (not infrequently in combination with tea), but also to some extent in British Malabar, Coorg and the slopes of the Shevaroy Hills in the Salem district has been done, while the Burma Government plantation at Mergui having demonstrated that Para rubber could be successfully grown in Burma was, about 1910, sold to a limited company, and other plantations opened there and in the neighbourhood of Rangoon.

ACREAGE UNDER RUBBER IN INDIA.—The total area under rubber cultivation in India at the end of 1922 amounted to 127,458 acres, compared with 123,983 acres in 1921, 124,167 in 1920, and 118,536 in 1919. In the pre-War year it was 96,183 acres. Included in the above total, however, are 3176 acres of *Ficus elastica* (the Government plantations in Assam, which have seldom produced more than a few tons) and 2265 acres of Ceara, from which the total production was 10 cwt. The remainder is Hevea. Of the total area 48 per cent is in Burma, 32 per cent in Travancore, 8 per cent in Madras, 7 per cent in Cochin, 2 per cent each in Assam and Coorg, and 1 per cent in Mysore.

In addition to the above acreage under rubber, there were (belonging to present rubber estates proprietors at the end of 1922) 3463 acres cleared ready for planting and 34,277 acres of reserve land. The total area tapped during 1922 was 61,086 acres, or about half the total area after deducting the Ficus and Ceara acreage. It would therefore appear that if the untapped area comes on equal to that at present in tapping, India will have a reserve capacity a few

years hence equal to fully as much again as her present output. It is a little doubtful, however, whether the untapped area is potentially as good as that at present in bearing, and the doubt is fortified by the figures which are available of the acreage abandoned in recent years. In 1922, 2701 acres; in 1921, 4990 acres; and in 1920, 6530 acres went out of cultivation, which does not look as if they could have been regarded as a valuable investment. Abandoned rubber areas, while suffering from lack of attention are still potential sources of supply in the event of the price of rubber once more mounting to a figure which would make it remunerative to clear them of undergrowth and work them.

PRODUCTION AND YIELD PER ACRE.—The total production of raw rubber during 1922 was 11,820,286 lb. (Hevea, 11,802,866 lb.; Ceara, 1120 lb.; and *Ficus elastica*, 16,300 lb.) as against 9,056,430 lb. in 1921 (the year of the Moplah rebellion) and 13,788,908 lb. in 1920. The yield per acre of tapped area was 209 (93) lb. in Cochin, 208 (170) lb. in Travancore, 194 (199) lb. in Burma, 160 (54) lb. in Madras, 100 (29) lb. in Coorg, and 32 (53) lb. in Mysore, the figures for 1921 being shown in brackets. These yields are much below those reported from other parts of the East, and it is a general opinion that Southern Indian estates will never be high yielders, but it must be remembered that the years under discussion were slump years, and that in one district at least there was interference by the rebellion. In 1920 the average yield per tapped area was better: 243 in Burma, 222 in Cochin, 199 in Travancore, etc.

REASON OF LOW AVERAGE YIELD IN SOUTH INDIA.—The reason for the low average yield on South Indian rubber estates is in part the high elevation at which many estates are situated (2000 feet and up to 3700 feet), while unsuitable soil conditions and the very pronounced dry season are also partly to blame. Rubber is also subject in South India to the disease called "Secondary Leaf Fall," and this presents the most serious problem that the South Indian Rubber Planting Industry has to face. Observations upon secondary leaf fall show that it is much more prevalent on trees growing in poor soil than on trees in good soil, or in situations where they obtain supplies of manure. As it seems evident from this, and other observations, that resistance to leaf fall is less due to the possession of any specific character than to some condition in the tree—possibly to some constituent of the cell sap developed in trees growing in favourable situations—attempts have been made, both by manuring in the ordinary way and by arranging experiments in which the roots are allowed to absorb nutritive solutions directly, to discover the factor which assists in producing resistance. So far it has not been found. The experiments, however, led to the production of an interesting set of figures showing the girth measurements of five plots, all differently manured, four of which suffered a retardation in growth following upon the application of manures. The proportionate manner in which the retardation varied, according as the manuring was light or heavy, was very striking; and it was clear from the evidence adduced that the benefits anticipated from the manuring of rubber areas are frequently more than offset by the damage occasioned in digging or forking in the manures. On the yield the effect of the treatment was negative. No measurable improvement

in output was recorded as the result of forking or cultivation, while only in one instance was the evidence favourable to manuring.

LABOUR.—The daily average number of persons employed on the plantations during 1922 was returned at 30,356, as compared with 29,404 in the preceding year and 52,466 in 1920.

DIVIDEND-EARNING RECORD OF INDIAN RUBBER INDUSTRY.—The following is the dividend-earning record of the Sterling rubber companies owning properties in South India. It includes *all* Sterling rubber companies operating in South India whose accounts are available and whose preponderating interest is not in Tea. None of these companies declared dividends prior to 1910 :—

DIVIDEND RECORD OF STERLING COMPANIES OWNING RUBBER ESTATES IN SOUTH INDIA.

	1910	1911	1912	1913	1914	1915	1916	1917	1918	1919	1920	1921	1922
Average Dividend per cent	1.10	3.00	5.04	2.58	3.65	8.34	11.70	5.92	7.30	7.73	1.15	0.57	1.53
No. of Companies	9	11	12	12	13	13	13	13	13	13	13	13	13
No. of Companies paying no Dividend	8	7	6	5	7	4	3	3	3	5	11	13	13
Grand average annual dividend over 13 years	4.58 per cent. Over last 5 years = 3.65 per cent.												

A similar record for Sterling rubber-growing companies operating in Burma is as follows :—

DIVIDEND RECORD OF STERLING COMPANIES OWNING ESTATES IN BURMA.

	1911	1912	1913	1914	1915	1916	1917	1918	1919	1920	1921	1922
Average Dividend per cent	3.33	3.00	1.50	2.00	7.00	14.10	12.20	10.00	12.00	1.25	0	3.75
No. of Companies	3	4 ¹	4 ¹	5	5	5	6				6	6
No. of Companies paying no Dividend	3	4	4	6	5	5	3	4	3	5	6	6
Grand average annual dividend over 12 years	5.84 per cent. Over last 5 years = 5.4 per cent.											

In the case of both South India and Burma companies the accounting period often ends on the 31st March in the following year ; hence (allowing for delay in marketing) up to 70 per cent of the crop may have received the benefit of post-restriction prices. The highest dividend paid by a South India Sterling rubber company was 25 per cent.

The highest dividend paid by a Sterling rubber company in Burma was 42 per cent, distributed by the Shewegyin Burma Rubber Estates, Ltd., in respect of 1917.

RUBBER IN BURMA.—The rubber plantations in Lower Burma, though also within the Indian Empire, are under a somewhat different fiscal dispensation from those in South India. There is, for instance, an export duty (but this is not leviable when the price of rubber is below 1s. 5½d. per lb.). Both the incidence of export duty and the grant of lands for rubber growing are controlled

¹ A guaranteed dividend of 6 per cent was paid to the shareholders of one Company in these years and is included in the average.

by the Burma Government Land Revenue Orders of the 14th July, 1916, and the 19th November, 1916, which introduced the present system and replaced an older arrangement which was believed to be hindering the development of rubber planting in Burma.

Up-to-date information regarding the state of the rubber plantations in Burma is provided in the report¹ of Mr. H. C. Pinching (Senior Scientific Officer of the Rubber Growers' Association in Malaya), who paid the country a visit of inspection during the latter half of 1923. Mr. Pinching found that with a few exceptions rubber estates and rubber growing in general in Burma had made very satisfactory progress since his last visit in 1920, and, in spite of the serious depression which the Industry has experienced since that time, the majority of Burma estates continued to be well and efficiently cared for. The growth and development of the trees, where they have been properly cared for, have been very satisfactory, and it appears that with proper care and attention *Hevea brasiliensis* can be grown as successfully, at least from the general development and structure of the tree point of view, in Lower Burma as in Malaya, in spite of the seasonal weather experienced in the former country. One of the finest and most uniform fields of rubber is to be found on one of the more northern of Lower Burma estates, where the annual rainfall is the lowest recorded on any estate in Burma, and where practically no rain falls from the end of November to the commencement of the following May.

YIELDS IN BURMA.—As already noted, yields in Burma are better than in South India. It cannot be denied, however, that the average yields from Lower Burma estates are less than those from Malayan properties. Considering that the average growth of the trees on estates in the Mergui and Tenasserim district is about equal to that of trees on Malayan estates, this inferiority of yields cannot be due to any peculiarity of the trees. Indeed, examination of records on estates shows that the average return per coolie per tapping is equal to the average return on Malayan estates, while the average tapping cost per pound on Burma estates is as cheap, if not cheaper, than that for Malayan estates. A careful examination of the question would seem to show that the lower yields per acre per annum harvested on Burma estates, as compared with that from Malayan estates is mainly, if not wholly, due to the fact that in Burma one can tap on fewer days during the year. Several estates not only stop tapping during the S.W. monsoon period, but also during the period of refoliation after the wintering of the trees. This means a cessation of tapping for over three months (June, July, August, and part of September) for the monsoon and nearly a month for refoliation, a total of four and a half months. Thus, last year one estate tapped on 214 days only (107 times each task on alternate days), the remaining 151 non-tapping days were made up of 23 for refoliation during February and four months (June–September) for the rains. It would, therefore, seem that if Burma estates are to give yields per acre per annum comparable with those from Malayan estates, it will be necessary to increase the amount of tapping per tree per annum. This is not such a simple matter as it may appear

¹ R.G.A. Bulletin, December, 1923.

to be, and more or less serious objections can be raised to any method of bringing it about. Under ordinary circumstances tapping during the refoliation period is perhaps a possibility provided that the crop then harvested makes the procedure a profitable one.

RUBBER TREE DISEASES IN BURMA.—Abnormal leaf fall disease is present on every estate in Lower Burma to a greater or less extent, and diseases of the aerial portion of the tree are prevalent to a greater degree than in Malaya, but there is remarkable freedom from root disease. Since the introduction of alternate-day tapping on the majority of estates there has been much less trouble with Brown Bast.

EXPORTS OF RUBBER FROM INDIA AND STOCKS.—As will be seen from the consolidated table of rubber supply (p.) the exports of rubber from India (including Burma) rose with great rapidity till 1918, since when the ascending curve has flattened out to end in a decline for 1922 to 4854, against 5305 tons in 1921. It must be remembered, however, that the shipments at the end of 1918 were exceptionally heavy, not altogether because of increased production, but owing to release of stocks previously held up by the tonnage shortage; similarly the decline in 1922 is partly due to accumulation of stocks, which in recent years have been (at 31st December): 1922 (1630 tons), 1921 (1390 tons), 1920 (2231 tons), and 1919 (1836 tons). Of the total rubber exports in 1922 (4854 tons) 2436 tons, or almost exactly half, was shipped to the United Kingdom; 1266 tons were sent to Colombo, which continues to be an important entrepôt for rubber grown in Southern India, and 561 tons went to the Straits Settlements—Singapore being a similar entrepôt for Mergui (Burma) rubber. The United States took about 480 tons and other countries the balance.

VOLUNTARY REGULATION OF EXPORTS.—While India does not come within the scope of legislation such as that which has been introduced in Malaya and Ceylon to limit the export of rubber, a scheme for voluntary restriction has been submitted to producers in South India, and with certain alterations has so far been adopted by owners of 34,557 planted acres (owned in Great Britain) and by local estate proprietors owning 2362 planted acres. In the case of owners domiciled in Great Britain the number of assents represents 85 per cent of the total planted acreage controlled by them. The scheme took effect as from the 1st November, 1923, for a period of twelve months. Producers are permitted to sell in India or export all stocks of rubber produced up to the 31st October, 1923. Subject thereto, assenting producers agree in respect of rubber harvested during the said twelve months not to sell in or export from India during such twelve months a greater quantity per tappable acre than the amounts permitted in the following paragraph.

For any period as permitted by legislation in Malaya or Ceylon, the quantity exportable from those countries at the minimum rate of duty is 60 per cent or less of the "standard production" assenting producers may export at the rate of 220 lb. per tappable acre per annum, and for every increase of 5 per cent in such exportable percentage permitted to producers in Malaya or Ceylon,

assenting producers may export at the rate of a further $12\frac{1}{2}$ lb. per tappable acre per annum, e.g.

When quantity exportable at minimum rate of duty in Malaya and Ceylon is:—	The maximum quantity exportable per tappable acre in respect of South India shall be:—
60 per cent (or less)	220 lb. per annum.
65 "	233 $\frac{1}{2}$ "
70 "	245 "
75 "	257 $\frac{1}{2}$ "
80 "	270 "
85 "	282 $\frac{1}{2}$ "
90 "	295 "
95 "	307 $\frac{1}{2}$ "
100 "	320 "

The South Indian Committee of the Rubber Growers' Association (London) is to act as a committee to deal with all questions relating to the administration of the scheme, including claims for allowances and concessions, and report to the parent body the decisions arrived at.

CHAPTER V

GEOGRAPHICAL SURVEY: RUBBER (*continued*)

4-7. THE RAW RUBBER INDUSTRY OF BRITISH N. BORNEO, BRUNEI, SARAWAK, PAPUA, AND NEW GUINEA

[Statements and data revised to January, 1924; and statistics complete to December 31st, 1922.]

Rubber in British North Borneo: Acreage under Cultivation. Capital Invested. Labour and Cost of Production. Profits and Cost of Production. Exports of Rubber. Freight and Shipping Facilities. Land Grants. Rubber in Brunei. Rubber in Sarawak. Rubber in Papua and the Territory of New Guinea.

4. RUBBER IN BRITISH NORTH BORNEO

THE Rubber Planting Industry in British North Borneo has been developed under a somewhat unusual system introduced by the late Mr. Wm. Clarke Cowie (then Chairman of the Chartered Company, which administers the country). In order to attract capital into rubber planting in the Company's territory, Mr. Cowie granted concessions of land, to which were added two special inducements, viz. a remission of duty on plantation rubber for fifty years (this concession applies only to rubber land alienated before 1st June, 1917), and a guaranteed interest of 6 per cent to be paid by the Chartered Company until the estates had come into bearing, and thereafter refundable to the Chartered Company out of profits. Twelve companies were formed on the basis of these terms, the first in 1905 and the

others in successive years up to the "boom" year of 1910. Enterprise was not left entirely to the Chartered Company: the North Borneo Trading Company, which owns large areas of land in the State, floated four subsidiary companies, and the large tobacco companies began to devote part of their land to rubber. Land was taken up mainly alongside the railway which runs from Jesselton, the port on the West Coast, to the Interior. Some of it was not the best land in the country by any means, but it had the advantage of having an easy access to the nearest port to Singapore.

Mr. Cowie's policy has been justified by results, for while in 1914 the guaranteed dividend advances amounted to £247,700, at the present time they are little more than £65,000, and out of twelve companies which received this concession nine have paid back the loans in full.

ACREAGE UNDER CULTIVATION WITH RUBBER.—The latest returns show a total of 58,324 acres under rubber, of which 35,000 are now six years old and over, and 30,000 are over ten years old.

West Coast	33,944 acres.
East Coast .	11,586 "
Sandakan .	4,817 "
Interior .	4,619 "
Kudat .	3,358 "
	<hr/>
	58,324

As a result of the slump in rubber prices, the area being tapped, which was 29,970 acres in December, 1919, fell to 25,434 acres in December, 1920, and to 24,526 acres at the end of 1921.

CAPITAL INVESTED.—Most of the above area is owned by British companies, but a few large estates are owned by Chinese and Japanese, and there are numerous small native and Chinese estates totalling 9348 acres.

LABOUR AND COST OF PRODUCTION.—The labour employed on rubber estates in British North Borneo is principally Chinese and Javanese, but in recent years an increasing use has been made of natives of the country. Of 14,674 coolies employed on large estates in 1918—the latest year for which figures are procurable—47 per cent were Chinese, 26 per cent Javanese, and 27 per cent natives. The slump has hit North Borneo companies hard; nevertheless, no estate of any size has ceased operations except one, whose failure was due as much to badly selected land as to the depressed condition. In many cases drastic economies have been effected; staffs and labour forces have been perforce reduced. It is fairly safe to say that the expenses on most estates have been cut down as far as is compatible with efficiency. The reduction in tapping costs is naturally much harder on hilly estates, such as most of those on the West Coast, where a coolie cannot tap more than 300 trees a day, than on flat estates (which are in the minority), where a coolie's task is 500. Moreover, North Borneo companies are hit by the freight from Borneo to Singapore, which is high, and this not only applies to outgoing rubber but to incoming rice, the greater proportion of which has to be imported. The rice question in North Borneo is a thorny one. At present the State produces 50 per cent of its *padi*

(unhusked rice) requirements, but the native population is wholly a rice-eating one. There is a rice mill on the West Coast which has received Government support, but there are difficulties in the way of any large extension of cultivation, for the population is not large, and the Chartered Company is not at present in a position to incur heavy expenditure on encouraging immigration of Chinese; in addition to this the Chinese labourers on estates have a great preference for imported, that is, polished, rice. This is a serious factor in reducing expenses, especially in times of rice shortage such as have recently been passed through, when every estate had to lose large sums over the increased cost.

PROFITS AND COST OF PRODUCTION.—The following table shows the results of working of the principal rubber planting undertakings in British North Borneo since 1910—the year of the Rubber Boom. The six oldest companies were formed in 1905 or 1906; six more from 1907 to 1909 inclusive; one in 1910; one in 1914 (a reconstruction); and one in 1920 (to take over a bearing estate). Results of working of a company formed in 1913 and which had an unsuccessful career until 1923, when a receiver was appointed, have been omitted from these general averages, which refer only to companies in existence.

The results for the five years to 1922–23 show an average annual dividend of 3½ per cent. The results for the seven years to 1922–23 (i.e. practically since the cessation of guaranteed dividends) show an average annual distribution of 4·04 per cent. Ten year results=4·28 per cent average dividend. Thirteen year results=4·47 per cent average dividend.

A substantial decrease in costs of production will be observed in recent years and is very creditable to the managements concerned. Two companies are now below 8d. and three between 8d. and 9d. The comparison of “all in” costs commences with 1915–16. It should be mentioned that the guaranteed dividends during the period of development ranged from 4 to 6 per cent.

FINANCIAL RESULTS AND COST OF PRODUCTION OF RUBBER ESTATES IN BRITISH NORTH BORNEO

	1910	1911	1912	1913	1914	1915	1916	1917	1918	1919	1920	1921	1922
(1) Average Ordinary Dividend per cent .	4·16	5·54	5·54	3·54	4·48	6·53	7·30	2·70	2·83	13·18	0·31	0·60	2·00
(2) No. of Companies under review in respect to (1) .	12	13	13	13	14	15	15	15	15	15	16	16	15
(3) No. of Guaranteed Dividends included in average .	9	10	10	6	5	4							
(4) Non-dividend payers taken into average .	2	—	1	5	4	2					15	16	
(5) Average “All-in” Cost (pence) .	(insufficient returns)					18·23	16·96	16·97	16·86	14·72	16·69	13·39	10·77
(6) No. of Companies whose costs are reviewed .						12	12	12	12	15	16	14	13

NOTE.—One company reconstructed in 1920 is included both for past and forward history; another company reconstructed in 1914 is included from that date onwards. The liability of certain companies to repay advances for guaranteed dividends must be kept in mind in studying this table.

EXPORTS OF RUBBER.—The exports of plantation rubber in recent years have been (1920) 4117 tons, (1921) 3121 tons, (1922) 3749 tons, and these compare with a pre-War export of (1913) 491 tons. The set-back in 1921 was due to the fact that practically all local companies restricted output by 25 per cent. in accordance with the voluntary restriction scheme put forward by the Rubber Growers' Association.

FREIGHT RATES AND SHIPPING FACILITIES.—Steamship communication between Sandakan and Eastern countries has improved considerably in the last few years, but the same cannot be said of the connection with Singapore and Europe. However, it is now understood that the Straits Steamship Company have placed an order for the first of two new steamers of a larger and better type which are to be placed on the Borneo run. Equally urgent is the necessity for a reduction of the high freight rates at present charged. Although the freight surcharge of 75 per cent by the Straits Steamship Company in force since 1921 was reduced to 50 per cent in the second half of 1922, the through freight rate on rubber from Borneo to London was only slightly lowered. The through rate is now £4 10s. per measurement ton, as compared with only £2 10s. from Singapore to London. Endeavours are being made to secure further reductions and to remove this handicap to rubber producers.

British North Borneo is, of course, outside the scope of the export restrictions in force in Malaya and Ceylon, but all the planting companies agreed to fix a maximum rate of production of 75 per cent in respect of 1923, and it is proposed to continue restrictive measures on the same basis for 1924.

LAND GRANTS.—New land terms are announced under which areas not exceeding 640 acres will be alienated for any form of cultivation. Terms are : Premium, nil ; rent, first six years, nil ; rent, next four years, 50 cents per acre per annum ; thereafter, \$3 per acre per annum ; during the nil and low rent period no dealing in such areas is permitted except with the sanction of the Government ; no consolidated timber royalty will be charged on any area of land under 1000 acres ; a cultivation clause will be enforced. To assist Chinese already in the State to bring friends and relations to North Borneo, State-aided passages will continue throughout 1924-25.

5. RUBBER IN BRUNEI

Though the rubber planting industry in Brunei is comparatively small, rubber ranks third in importance among the exports from the country. The approximate area of the rubber plantations in the State (estates over 200 acres) is 2685 acres, of which 1488 acres are in tapping. There are also a number of estates and small holdings of under 200 acres, regarding which the only information available is the number of trees tapped (202,300), and not yet tapped (191,700). The exports amounted to 153 tons in 1920, 88 tons in 1921, and 141 tons in 1922. The number of coolies included in the estate population at the census of 1921 was 777, of which 566 belonged to Malay races, and 195 were Chinese. For 1922 the only data available states the approximate number of coolies employed on five rubber estates of over 200 acres, viz. 459, including

Bruneis and Kedayans, 296 ; Chinese, 122 ; and Javanese, 77. There is, it appears, a general desire on the part of planters to employ Tamils on estates, and the Government has applied for sanction to recruit this form of labour.

6. RUBBER IN SARAWAK

There are, unfortunately, no records of the acreage of rubber planted in Sarawak. The exports in 1922 amounted to 3770 tons, against 2102 tons in the previous year and 253 tons in 1913. Shipment is made to Singapore for transshipment there. This native rubber contains a large percentage of moisture and should not be reckoned the equivalent of the same weight of rubber from countries where dry rubber is prepared.

Rubber is planted for the most part by squatters, who hold their land under permit and do not pay by the acre. There are records of the number of trees being tapped, but these are far from reliable. It is possible that complete surveys of all rubber lands may be available within the next few years, but of this there is no certainty. There is one Sterling rubber company operating in the country.

7. RUBBER IN PAPUA AND THE TERRITORY OF NEW GUINEA

A retrospect of Papuan agriculture shows that it can be divided into four phases, the first being an initial stage of experimental and tentative effort which lasted about three years, from 1907 to 1910. Then followed a period of rapid development, commencing in 1910 and lasting until the outbreak of War in 1914. Over 30,000 acres were planted during this period, mainly in coco-nuts, but including a very fair proportion of rubber. There was a period of comparative stagnation during the War, capital and enterprise being diverted elsewhere and development remaining at a standstill, not only in Papua, but in most of the Crown Colonies ; during the last two years of the War many of the earlier rubber plantings came into bearing. The post-War period has so far been marked by complete stagnation as regards development in all agricultural industries, and rubber areas amounting to 1000 acres or more have been abandoned, owing to the impossibility of working estates at a profit under conditions prevailing up to November, 1922. The highest rubber acreage reported was 8598 acres in 1919 ; it has since declined to 7465 acres at December 31st, 1919, this area being distributed as follows : Central Division, 5727 ; Eastern Division, 1136 ; Western Division, 92 ; Northern Division, 145 ; and Delta, 365 acres. The whole of this area has now reached the bearing stage, and at the lowest possible estimate should be capable of an annual output of 600-800 tons. The actual exports, however, have been 242 tons in 1920, 220 tons in 1921, and 85 tons in 1922 ; during the greater part of the last-named year tapping had ceased on all the rubber estates in the Territory, the estates being left in the charge of caretakers, with a few native labourers to combat disease and keep weeds within bounds. The Government have adopted the same procedure as other plantations in placing the Kemp Welch Plantation (Govern-

ment-owned) under an officer-in-charge and seventeen natives. This estate has 240 acres of Para rubber, planted 100 to the acre, and it is stated to be looking exceptionally well. The Department of Agriculture's estimate is that a minimum of 2s. per lb. f.o.b. Port Moresby is necessary to make rubber a paying proposition in Papua. Since this estimate was made, however, the British New Guinea Development Co., Ltd., has reopened its rubber estate of 1540 acres—on which tapping had been stopped for two years—and secured a crop of 128,281 lb. for the nine months ended October 31st, 1923, the "all in" cost of which, delivered in Australia, is given at "under 10d. per lb." As this cost included the expense of restarting the plantations, it must stand as a remarkable achievement and, if maintained, will no doubt lead to the reopening of other estates. The territory is very badly situated for transport, whereas the former German New Guinea was served by three lines of transport to Europe, to Australia, and to Asia.

In the Territory of New Guinea before the War the Germans made the mistake of planting principally *Ficus* and *Castilloa*. As early as 1909 there were 5200 acres under cultivation with rubber, and at the 1st January, 1914, the acreage position was as follows :—

Crop.		Bismarck Archipelago.	Mainland.	Total.
<i>Ficus</i>	acres	1945	1819	3764
<i>Hevea</i>	"	902	361	1,263
<i>Castilloa</i>	"	413	124	537

The results have been very disappointing, the total exports having amounted to only 19 tons, value £6917, in 1913, and 29 tons in 1920-21, value £2900. Much of this rubber is grown among Alang Alang, a tall native grass. The general opinion among planters seems to be that the cultivation of coco-nuts is a safer and better investment than rubber in New Guinea, because the latter offers a less fluctuating margin between profit and loss and does not call for the employment of as many labourers as are required on a rubber plantation. The New Guinea native is also not well suited for the work of tapping and the close and careful attention that the rubber trees demand. There are no recent acreage statistics, but it is understood that a great proportion of the area reported as under rubber in 1914 has subsequently been totally abandoned. The recruiting and employment of natives is now regulated by the Native Labour Ordinance, 1922, which prescribes a scale of rations, conditions of housing, etc. Wages are fixed at a minimum of 5s. a month for male labourers, 4s. for females, and 3s. for boys under sixteen. The maximum is 10s. unless the native is specially qualified.

CHAPTER VI

GEOGRAPHICAL SURVEY: RUBBER (*continued*)

8-12. THE RAW RUBBER INDUSTRY IN THE BRITISH COLONIES IN AFRICA, WITH A NOTE ON SMALL PRODUCERS ELSEWHERE

[UGANDA, NYASALAND, TANGANYIKA, WEST AFRICA, BRITISH GUIANA, TRINIDAD, BRITISH HONDURAS, FIJI]

[Statements and data revised to January, 1924 ; and statistics complete to December 31st, 1922.]

Rubber in Uganda : Historical and General. Acreage of Para Rubber in Uganda. Growth and Bark Renewal. Dividend Earning Record of Uganda Rubber Companies. Cost of Production. Labour. Transport. Rubber in Nyasaland. Rubber in Tanganyika : Financial Results. Rubber in British West Africa. Rubber in British Guiana, British Honduras, Trinidad, and Fiji.

8. RUBBER IN UGANDA

HISTORICAL AND GENERAL.—Uganda made its first appearance as a rubber producer by furnishing supplies of wild rubber from *Funtumia elastica*. This tree, of which there are large forests in Uganda, produces a rubber of beautiful silky appearance, once fairly well-known on the London market. The export of *Funtumia* rubber reached its highest record (47 tons) in 1909, but the product has since practically disappeared from the market. The tree proved entirely unsuited for cultivation purposes, as it requires about twenty years to attain a tapping girth. The first rubber estates in Uganda were planted with Ceara (*Manihot glaziovii*) or with one or other of the Manihots or with *Castilloa elastica*, owing to a belief that Para rubber (*Hevea brasiliensis*) was unlikely to thrive at the altitude (4000 feet) of the planting districts or under the local conditions of rainfall and temperature. *Castilloa* proved a total failure, being particularly vulnerable to the attacks of the borer beetle ; Ceara, though growing well, was found to be a very poor yielder, while the other Manihots turned out to be unsatisfactory, being too brittle to withstand the prevailing winds. In recent years, therefore, the general practice has been to plant Para rubber, though the conditions of elevation, temperature, and rainfall must always put Uganda planters at a disadvantage as compared with their Eastern rivals. The Buganda Province, in which most of the rubber is grown, has an annual rainfall of only about fifty inches (against 100 to 150 inches in the more favoured rubber-growing regions of the East), and the high elevation has a retarding effect on growth. Two compensating factors are, however, found in the regular distribution of the rainfall throughout the year and the high moisture-retaining capacity of the local soils. Uganda, unlike most parts of the East, has no well-defined dry season. Not a month passes but some rain falls. As a result it has been proved possible—though not as yet very profitable—to grow Para rubber in Uganda. The future of the Industry must depend upon the price

of the commodity, for as far as can be seen at present, there is no possibility of profitable working of the majority of Uganda estates at the low price at present prevailing (which, nevertheless, allows a margin of profit to most Eastern estates). The reasons for this will be more fully discussed under the heading "Cost of Production." Exports in 1913-14 amounted to 4½ tons of wild and 8½ tons of plantation rubber. In 1922 they were 56 tons—all of plantation rubber.

ACREAGE OF PARA RUBBER IN UGANDA.—The total acreage of Para rubber under European management is approximately 17,500 acres,¹ distributed as under :—

Description.	Buganda Province				Eastern Province	Northern Province	
	Mengo.	Entebbe.	Masaka.	Mubendi.	Busoga.	Masindi.	Hoima.
Acreage under six years old	5499	1084	528	299	447	1323	100
Acreage over six years old	6114	1354	160	215	300	79	—
Total . . .	11,613	2438	688	514	747	1402	100

In addition to the above, there are about nine hundred acres of native-grown Para, mostly in the Buganda Province.

Some 12,000 acres out of the 17,500 acres of European-owned Para are interplanted with *Coffea arabica* (other and probably later estimates state nearer 9000 acres, pointing to coffee or rubber having been cut out).

Unlike the rubber in the Middle East, there is no considerable acreage concentration. Even in the case of the plantations controlled by the few limited companies, the largest compact block barely exceeds 500 acres. By far the greater portion of the rubber is distributed in the form of small 50-250 acre estates, situated for the most part in the Kiagwe district.

Here and there estates are individually owned and managed, but the majority are controlled and supervised by a local syndicate, which undertakes these duties for absentee owners.

GROWTH AND BARK RENEWAL.—The rate of growth (increase of girth) of Para rubber in Uganda is much lower than in the East, and many plantations have taken upwards of nine years to reach the bearing stage. An annual increase in girth of about 2·7 to 3 inches is about the average, and this means that tapping dimensions are attained in just over seven years. Compared with Malaya, where the usual bearing age is five, and in specially favoured districts four years, this is a severe handicap. Happily, however, there is a set-off. In the East estates are by no means uncommon whereon the average rate of girth increase has slowed down from 4 to 5 inches in the fifth year to as little as 1½ or 2 inches in the tenth year after planting. The crowns become scantier year

¹ An official estimate. However, a rather later estimate, published at the end of 1923 in the 1922 Blue book, gives 13,417 acres as the area under Para rubber on European estates, excluding Mission Stations, at the end of 1922, of which 3379 acres were under 5 years old and 9589 acres over 5 years old (balance undetermined) at that time. There were also 1460 acres on Indian estates of which 430 acres were below 5 years old.

by year and the yields instead of showing an annual increase either decline or remain stationary. This is due to the amount of loss of top soil, especially on clean weeded estates, caused by the heavy rainfall. In Uganda, on the other hand, the amount of wash which goes on, though not negligible, is insufficient to bring about any marked retardation in growth in later years. Both in girth expansion and foliar spread there is a steady improvement year by year. Thanks to the better-sustained growth of the trees, plantations which at anything under eight years were miserably inferior to their Eastern rivals, compare at a later stage very favourably indeed. The average thickness in bark on a seven-year-old tree in Uganda is stated to be between 6 and 7 mm. Hevea bark in Malaya attains the same average thickness in four and a half to five years. Since bark of less than 7 mm. is only tappable with difficulty, and can scarcely be regarded as mature, a wait of seven years before tapping is commenced is seen to be necessary from these as well as from girth considerations. The rate at which Hevea bark renews after tapping is approximately the same as the rate of increase in thickness of the original bark prior to reaching maturity, and trees which require seven years to reach the bearing stage should, therefore, be allowed a minimum of seven years for renewal.

DIVIDEND EARNING RECORD OF UGANDA RUBBER COMPANIES.—Of the three large Sterling rubber companies operating in Uganda the most successful (Kivuvu) paid dividends of 5 per cent for 1912, 10 per cent for 1913, 7½ per cent for 1914, and 10 per cent for 1918—total 32½ per cent in twelve years up to and including 1922. One of the others paid dividends for 1909 and 1910 and nothing since—total 12½ per cent in the sixteen years of its existence, and the third, formed in 1913, has paid no dividend yet.

COST OF PRODUCTION.—The actual figures relating to the costs of production on four Uganda estates for the year 1920–21 are given below :—

	Estate A Yield 200 lb. per acre. Cts.	Estate B Yield 150 lb. per acre. Cts.	Estate C Yield 175 lb. per acre. Cts.	Estate D Yield 160 lb. per acre. Cts.
Tapping and collecting latex	12	19	15	17
Curing and packing	7	7	6	5
Weeding and general upkeep	6	7	7	4
Tools, etc.	1½	1	2	1
Freight	11½	12	12	12
Selling charges	8	8	8	9
Overhead expenses—European :				
Management, upkeep, building, etc.	—	21	15	26
London office charges	—	—	7	6
Total	46	78	72	80
Sterling equivalent	11d.	1/6	1/5½	1/7

“Estate A” in the first column is a small estate without European manager. It is run by a native superintendent.

The four estates selected above are the cheapest producers. Most of the

other estates were more expensively run, and so far the cost to them of producing and placing on the London market 1 lb. of their rubber has been anything from 1s. 9d. to 2s. 1d. Some eight to ten years ago, when the majority of the Malayan plantations were young, their average "all-in" costs were not far short of the Uganda figures.

But the position is that the Eastern costs are now much lower, and the Uganda estates just entering the bearing stage have to compete with the more mature Eastern plantations.

In the event of a substantial rise in the price of rubber taking place, it will not be absolutely necessary for Uganda to produce at as low a cost as the Eastern plantations (it will be simply a question of taking a smaller profit); but the question is still worth debating whether Uganda, by adopting a tapping system suited to local conditions and banking on the more steady annual increase in girth after a certain age (*supra* p.), may not bring her costs more into line with those reported from the East. This question has been considered by Mr. Ashplant, who, through the Department of Agriculture at Kampala, has published the following forecast showing the probable yields and working costs of the rubber portion of a mixed coffee and Para estate, from the commencement of tapping to full maturity. The total area of the estate is taken to be 400 acres, of which 200 acres are under rubber and 200 under permanent coffee. It will be observed that even under the best circumstances the maximum yield is placed no higher than 300 lb. per acre, which is, of course, much below maximum yields obtained in Ceylon, Malaya, etc.

FORECAST OF WORKING COSTS OF THE RUBBER PORTION OF A MIXED RUBBER AND COFFEE ESTATE IN UGANDA, FROM THE COMMENCEMENT OF TAPPING TO FULL MATURITY

Year.	8th	9th	10th	11th	12th	13th	14th	15th	16th
Yield per Acre	75	100	125	150	175	200	225	275	300
Total Crop (200 acres)	15,000	20,000	25,000	30,000	35,000	40,000	45,000	55,000	60,000
Tapping Costs	38	28	23	19	16	14	12		9
Curing, Packing	7	7	6	6	6	5	5		4
Rail, Ship, Insurance	10	10	10	10	9	9	8		8
Horne Charges	8	8	7	7	7	7	7	7	7
Proportion Upkeep of Estate	20	12	9	6	4	3	2	2	2
Utensils, Tools	2	1	1	1	1	1	1	1	1
Total Direct Charges	85	66	56	49	43	39	35	33	31
Proportion of Overhead Charges (half £750)	25	19	15	12	10	9	8	8	7
Total "All-in" Charges	110	85	71	61	53	48	43	41	38
Approximate Sterling Equivalent	2½	1½	1½	1½	1½	1½	1½	1½	1½

In the above estimate the wages assumed are those ruling to-day. Rail, shipping and insurance calculations are based on the revised rates and on the expectation of further reductions in sea freight.

The expenses under the respective heads may vary somewhat, but Mr. Ashplant is convinced from what he has seen that rubber in Uganda is capable of giving the yields and of being produced for the prices indicated. He is, however, equally convinced that the yields from the majority of existing

estates will, through various planting defects—bad selection, faulty planting, too few trees to the acre—fall short of those forecasted above. It is scarcely necessary to say that rubber production at the low costs indicated above will only be possible on a small high-class estate, and on an estate, moreover, which is not overburdened with management charges. Estates whereon the maximum yield is limited to 200 lb. per acre cannot, with the utmost economy, expect to market their rubber at under 1s., and where the general expenses of management are high, 1s. 3d. to 1s. 6d. will be the more likely figure.

LABOUR.—The disinclination of the Uganda native for any form of regular employment is one of the main obstacles to the economic development of the Protectorate.

As most of the rubber in the Protectorate is still immature, the labour problem has not yet been acutely felt everywhere, though already planters with 100 acres and upwards in bearing have found it difficult, and in some instances impossible, to get their trees regularly tapped, and their outputs have, in consequence, fallen far short of the possible.

With regard to the working day, this, it should be pointed out, is only of four to five hours' duration. Beginning at 6 or 6.30 a.m., the Uganda labourer expects to finish his task by 10 or 11 o'clock. In the East estate work commences at 5.30 a.m., and with two short intervals for food continues till 4 or 5 p.m. Coolies on task work usually complete their task by about 2.30 p.m. The amount of work performed in this time by the average coolie on Malayan estates is more than twice that done by a Uganda labourer. This is well shown in the tapping tasks of the respective countries. A tapper's task in Uganda usually consists of from 200 to 250 trees. Larger tasks have not been found practicable. In Malaya, on the other hand, not only is a task of 450 trees practicable, but tappers are accustomed to scrap and disinfect each tree, and not infrequently do some weeding as well.

Qualitatively, also, the class of work done by the Uganda native does not bear comparison with that of the Eastern estate labourers. For the grosser agricultural operations of weeding and cultivation, the Baganda are well suited, but on skilled work, such as tapping, they are stupid and clumsy, and infinite tact and patience on the part of the European superintendents are required in order to get good results. It takes something like six months to make a Mganda into a tapper, and many of them have neither the interest nor the perseverance necessary to complete their training. They dislike the regularity of the work, and when remonstrated with for careless tapping, readily throw up their job and leave the estate. Brought up by the abnormal circumstances created by the War to Rs.6 per month, wages have now been reduced by general agreement to Rs.4; to this wage food is often added. Expressed in rupees, this is roughly the wage which obtained before the War, but owing to the subsequent currency inflation and the stabilisation of the rupee at 2s., the sterling value of the wage has increased by 50 per cent.

TRANSPORT.—Owing to the awkward geographical situation of Uganda with reference to the world's markets, transport, which is so trifling a fraction of the "all-in" costs of other rubber countries, becomes a formidable item.

Until recently the cost of railing and shipping 1 lb. of rubber to London was not far short of 12 (florin) cents. It is now somewhere in the neighbourhood of 9 cents per lb. Compared with India or Malaya, where internal transport charges from estate to ship are only from 0.5 to 0.7 of a cent, and combined rail and sea freight to London between 1.5 and 3 cents, this figure still appears abnormally high. Owing to the proximity of the rubber estates to the ports on Lake Victoria, internal land transport has, for rubber, been a minor expense.

9. RUBBER IN NYASALAND

Rubber has not been a success in Nyasaland, chiefly because the climate of the Highlands is too cold and the rainfall insufficient. There was a good deal of activity in planting rubber trees (Ceara) about fifteen years ago, but the plantations have been a failure. Para rubber planted at Vizara, in the West Nyasa district, has given more promise of success. Rubber is also obtained from the indigenous *Landolphia* vines, which are found by the side of streams throughout the country. The total export amounted to 29 tons in 1913, and 40 tons in 1922, and it is doubtful whether Europeans will plant up any more land with this product.

10. RUBBER IN TANGANYIKA

A short reference may be made to the Rubber Industry in this mandated territory—the former German East Africa. The German East African Protectorate, as it has been developed for a quarter of a century before the War, was upon the commercial side an offspring of Hamburg. Its great trade monopolies—land-owning, shipping, railways, banks, and trading corporations—were all linked with one another and with Hamburg, and through Hamburg with the financial centres of Frankfurt and Berlin. Behind the network of financial and commercial interests were always to be found Imperial Government charters and concessions. From Lake Tanganyika to the Port of Hamburg, from the inland forests and plantations to the manufacturer in Germany, there ran a State-aided chain—controlled at every working link by a small group of German firms. German East Africa was organised almost as if it were the private estate of these business houses. There was little room in the system for foreign competition, and when war broke out not a single English importing house was at work in the Protectorate.

The pioneer corporation in the development of German East Africa was the Gesellschaft für Deutsche Kolonisation, founded in 1885 by Von der Heydt, of Hamburg, and Karl Peters, the explorer. Its policy appears to have been to set up its branches as separate concerns. When war broke out the D.O.A.G. was interested in the German East African Bank, in the Trade Bank, in the (Austrian) East African Company—and in several large plantations outside its own creation. The capital of this company in 1912 was eight million marks (£400,000). For fourteen years no dividend was paid on the Common stock, but from 1900 to 1911 dividends were paid on a gradually increasing scale.

They averaged 3·9 per cent during the twelve years and reached 8 per cent at the end of them.

A speculative period set in with the improved prices obtainable for tropical products in 1909 and 1910, and a large number of new plantations were opened up by companies and individuals. Some British capital was attracted during the rubber boom, and nine English companies were formed to plant rubber. More capital was invested in rubber planting in German East Africa than in any other German Colony, and the exports of plantation rubber rose rapidly from 228 tons in 1909 to 1053 tons in 1912. Practically all the cultivation, however, was of Ceara rubber (*Manihot glaziovii*) planted very closely so that the figure of 30,000,000 trees given out as representing the total investment in rubber before the War was very much less in potential producing capacity than the same number of Hevea trees in the East planted perhaps 100 to the acre. It is extremely doubtful whether any large percentage of these thirty million trees could have been exploited except at a loss, during recent years of low prices, even if continuous attention had been paid to their cultivation. As it is the whole area was practically abandoned during the War, and much became overgrown with brushwood. A very small proportion of the trees is being tapped, and the Department charged with the disposal of ex-enemy property has found difficulty in obtaining bids for leasehold rubber plantations.

Under these circumstances, against over 1000 tons of plantation rubber exported in 1912, the shipments in recent years have been (1919) 107 tons, (1920) 196 tons, (1921) 33 tons, (1922) 12 tons.

FINANCIAL RESULTS.—At no time has the cultivation of rubber in the present Tanganyika territory proved very profitable. Of the larger plantation companies existing in 1910, two only, besides the D.O.A.G. (already mentioned) were paying a dividend. One of these was a sisal company, which paid 12 per cent, and one was a British rubber company which had declared one dividend of 10 per cent. Of the nine British rubber companies formed in pre-War days several have disappeared. The accounts of the five remaining companies have been investigated and show that none of them has paid a dividend in respect of any year subsequent to 1913.

Company A—20 per cent in first two years. Nil in next 11 years.

„ B—10 „ „ first year. Nil in next 11 years.

„ C—6 „ „ second year „ „ „

„ D—8 „ „ 13 years. Nil for first 2 and last 9 years.

„ „ „ Tapping recommenced 1917, but stopped after a few months. Resumed again in April, 1920, and stopped late that year owing to it being found impossible to produce at a profit.

„ E—0 „ „ 13 years.

„ „ „ Tapping recommenced June, 1920, and stopped in October of that year owing to fall in price of rubber.

All these companies have, of course, laboured under the severe disability of having had their plantations in enemy hands during part of the War, and on

obtaining re-possession of the estates found them in neglected condition. Those which recommenced tapping appear to have given it up after a time, preferring to await the return of better days rather than produce at a loss.

II. RUBBER IN BRITISH WEST AFRICA

The Rubber Industry in all parts of British West Africa is of declining importance. The few rubber planting companies that have been started have proved less successful than those in the East, and the collection of wild rubber, which constitutes 99 per cent of the exports, has grown steadily less attractive to the natives at the prices that have ruled for the past ten or twelve years.

Until about 1905, the Gold Coast and Nigeria were the two most important rubber-producing countries in the British Empire, while Sierra Leone and Gambia shipped smaller quantities. The decline that has taken place during recent years can be studied in the general table of rubber production on page 50; it has brought the total quantity shipped from Nigeria, the Gold Coast, and other West African Colonies down from 1108 tons in 1913 (this was already 1500 tons less than the shipments in 1910) to a mere 131 tons in 1922—and of this quantity 124 tons was rubber from Nigeria, the chief source of which is the Ire, Funtumia or Lagos silk rubber tree, whose ordinary product is commercially known as Lagos lump rubber. The distribution in 1922 was :—

	lb.	£
To United Kingdom	262,102	13,722
„ Germany	16,074	652
„ Other Countries	150	3

278,326 = 124 tons £14,377

The reduction in exports has given West African wild rubbers a certain scarcity value which is in excess of their quality value as compared with plantation rubber. They are bought by a few manufacturers working on old recipes, and from the Eastern planter's point of view "sell on their demerits," i.e. tackiness, etc.

The larger production of West African rubber fifteen to twenty-five years ago was partly derived from various vines (Landolphias) which were tapped, crushed, or taken up by the roots by the natives. Ordinances were passed in Nigeria, Sierra Leone, etc., during 1905 and 1906, prohibiting the handling and exportation of root rubber, as it was called, but evidence had since accumulated that this was shutting the stable door after the mare had been stolen, and the destruction of the vines, together with the low price of rubber, which makes it unprofitable to seek them in out-of-the-way neighbourhoods where they may survive, the cost of head transport, and the diversion of so much native energy to more paying products make up the reasons for the eclipse of this once important native industry. Both Nigeria and the Gold Coast are no doubt capable of a certain increase in wild rubber output should prices ever rise to a level making the collection attractive; but in any view of the wild rubber industry it is necessary to remember that the exploitation

of virgin forest areas differs from that of plantations in many ways. The planter having capital invested in his property must work it in order to get interest on his money, however small, and save his investment. The native exploiter of wild forest areas owns only one kind of capital, his labour, on which he can get a more remunerative return in other ways.

12. SMALL PRODUCERS

RUBBER IN BRITISH GUIANA.—Rubber cultivation in British Guiana has hitherto proved unsuccessful from a financial point of view. It is calculated that there are 1,600,000 acres suitable for rubber cultivation in the country, and Crown leases are granted on exceptionally easy terms; the normal growth and yield of *Hevea* is also satisfactory. On the other hand, the labour problem presents great difficulties, and the South American Leaf Disease (*Fusicladium macrosporum*) which made its first appearance in the Colony so far as is known in 1909, has reduced the vitality of the trees to a low ebb. There are no less than five species of *Sapium* indigenous to the Colony, and of these two yield rubber of marketable quality. One (*Sapium jenmani*) was planted in the early days to the extent of 500 acres or more, but it was found that the tree does not respond to tapping, and only small yields were obtainable, chiefly in the form of scrap adhering to the bark.

Under stress of all these disappointments and unfavourable circumstances the area under rubber cultivation has declined from 5200 acres at its highest point (1917) to less than half that acreage to-day. Exports have never been large; they amounted to 11 tons at their highest (1918) and have since ceased altogether.

RUBBER IN TRINIDAD.—According to the Trinidad Warden's report there were 984 acres under rubber cultivation in the islands of Trinidad and Tobago in 1922, of which 400 were in the county of St. Andrew. Exports in recent years have been (1919) 28 tons, (1920) 13 tons, (1921) 5 tons.

Here again *Hevea* grows well, but it has usually been planted in small plots, which are said to present a neglected appearance, and has never been commercially profitable. Considerable numbers of *Castilloa*, *Funtumia* and other rubber-yielding trees were planted in the early days, but have since been cut down, and the area under rubber is much less than it was some years ago. Trinidad is the only island of the British West Indies in which rubber is grown to any extent.

RUBBER IN BRITISH HONDURAS.—The export of rubber from British Honduras has entirely ceased. There are two varieties of *Castilloa* native to the Colony and spasmodic efforts at planting have been made, but other pursuits are more profitable and employ the limited amount of capital and enterprise engaged in the industries of the Colony.

RUBBER IN FIJI.—The exports of rubber from Fiji amounted to 19 tons in 1913 and 4 tons in 1922. Between these dates the highest figures attained were 70 tons in 1919 and 67 tons in 1920. The Colonial Office report for 1922 states: "Owing to the continued low price of rubber the export has almost ceased." The total area under rubber (*Hevea*) in 1913-14 was estimated at not far short of 1000 acres, but later figures are not obtainable.

An indigenous rubber-bearing tree—*Alstonia plumosa*—exists in the forests in many parts of the group. At one time it was thought that there might be a considerable industry developed either by collecting rubber from the plants in their wild state, or by cultivating the plant. The chief drawback, and one of some magnitude, is that the latex does not flow from incisions in the bark, the latex vessels being scattered, more or less regularly, through the tissue of the stem. When leaves are broken off, or twigs broken across, drops of latex fall and may be collected. The process is tedious and, therefore, costly. If some simple mechanical process can be devised for obtaining the rubber from the twigs and leaves, it is possible that paying results might be obtained from the wild plants.

CHAPTER VII

GEOGRAPHICAL SURVEY: RUBBER (*continued*)

13-18. RUBBER RELATED PRODUCTS: THE GUTTA-PERCHA AND JELUTONG INDUSTRIES OF BRITISH MALAYA AND BORNEO, NIGERIAN GUTTAPERCHIA, THE BALATA INDUSTRY OF BRITISH GUIANA AND THE CHICLE INDUSTRY OF BRITISH HONDURAS

[Statements and data revised to January, 1924, and statistics complete to December 31st, 1922.]

The Gutta-Percha Industry in British Malaya: Cultivation. Gutta-Percha Trade in Singapore. Gutta-Percha Trade of the Straits Settlements. Singapore Trade in Gutta Inferior. Average Prices. The Jelutong Trade of British Malaya. The Gutta-Percha and Jelutong Industry in Borneo: Gutta-Jangkar. Jelutong in Sarawak and Brunei. Mode of Shipment and Sale. Refined Jelutong. Methods of Exploiting. Gutta-Percha from Nigeria. The Balata Industry of British Guiana. Licences to Collect Balata. Method of Exploitation. Value of British Guiana Sheet Balata. Chicle Industry in British Honduras.

GUTTA-PERCHA, balata, and jelutong are all substances obtained from forest trees in the same way as rubber, viz. by tapping. The two former are extremely important products on account of their use for the insulation of submarine cables. Other uses for gutta-percha are the manufacture of the gutta-percha tissue employed in surgery, as a fitting for teeth in dentistry, for the manufacture of golf ball shells—and formerly for the solid "guttie" ball which preceded the Haskell—for the manufacture of acid-resisting vessels, etc.

The uses of balata in addition to its employment as a dielectric are the manufacture of balata belting, balata soles for boots, and golf ball shells, while it also enters to some extent into compounds for rubber-manufacturing purposes.

The principal sources of gutta-percha and jelutong are British Malaya and Borneo, while British Guiana is the only part of the Empire producing balata to any extent.

The botanical sources of gutta-percha are several East Indian trees, of which *Palaequium oblongifolium*, known to the Malays as "taban merah," and *Palaequium obovatum*, "taban puteh," are the most important. The former yields a superior product.

Gutta-percha at ordinary temperature is rather like leather, but is not so flexible and has no elasticity. Before use it is boiled and cleaned, masticated and strained. It emerges as a dense material of a dark brown colour, plastic when warm. It is impervious to moisture, but softens at temperatures between 100 to 130° F., according to the natural resin content, and is therefore unsuitable for use at high temperatures. Although affected by exposure to air and particularly to sunlight, becoming resinous and brittle, yet when kept under water it will retain its qualities for an indefinite period.

The average weight of gutta-percha used per nautical mile of cable may be reckoned at about 180 lb., and the total weight of gutta-percha in use at the end of 1921 in connection with the world's submarine cable system (325,220 nautical miles) was about 26,000 tons. This works out at about eighty tons per 1000 miles of core length—a figure which gives an idea of the potential demand for gutta-percha in the event of new cable construction. Though the total output is comparatively small its significance is great.

Demand, as a matter of fact, has of late years tended to exceed supply, with the result that prices have risen. Business is done in gutta-percha and balata on the London market under the rules of the London General Produce Brokers' Association, but in the case of the former the importance of the London markets has declined since the submarine cable manufacturers commenced buying through their own agents in Singapore.

The following table shows the imports of gutta-percha and balata into the United Kingdom in 1913 and 1922 :—

IMPORTS OF GUTTA-PERCHA AND BALATA INTO THE UNITED KINGDOM

	Quantity (centals of 100 lb.)		Value	
	1913	1922	1913 £	1922 £
From Straits Settlements and Dependencies	57,295	16,227	552,333	244,809
„ British West India Islands ¹	795	3,404	9,747	44,934
„ British Guiana	10,789	10,619	132,226	157,860
„ Other British Possessions . . .	1,595	585	9,081	2,106
Total for British Possessions . . .	70,474	30,835	703,387	449,709
„ Foreign Countries	54,115	42,717	667,271	547,870
Total Imports	124,589	73,552	1,370,658	997,579
Reshipments	9,942	9,123	111,738	120,525
Net Imports	120,647	64,429	1,258,920	877,054

London wharfingers' charges (balata, gutta-percha, and jelutong) : Landing, 6d. per cwt. ; reweighing, repiling, or rehousing, 2d. per cwt. ; delivery to land conveyance, 3d. per cwt. ; to water conveyance, 4½d. per cwt. ; rent, 7d. per week per ton.

¹ Presumably transshipments of Venezuelan block balata and of sheet balata from the Guianas.

THE GUTTA-PERCHA INDUSTRY IN BRITISH MALAYA

In the Malay Peninsula "taban merah" (*Palaquium oblongifolium*) is indigenous and occurs in large forests in several districts. The Forest Department controls the natural supplies, and the systematic improvement of "taban" reserves is an important part of the work of that Department.

CULTIVATION OF GUTTA-PERCHA IN BRITISH MALAYA.—The most interesting development is the commencement of the cultivation of gutta-percha under plantation conditions. During periods of high prices for gutta-percha large numbers of trees were destroyed, being cut down by the natives in the endeavour to extract the maximum yield of latex. It is this proceeding that has made necessary the establishment of gutta-percha plantations. As *Palaquium* takes twenty or thirty years of growth before it is of tappable size, and then gives but a small yield of gutta, its cultivation on the same lines as rubber has proved impracticable from a commercial point of view. However, a means has been found of surmounting the difficulty. Instead of growing "taban merah" as a tree, it is grown as a shrub, and by a system of pruning at two years of age is made to assume a bushy habit and produce abundant low-growing foliage. The leaves of this shrub are collected and the gutta extracted from them by a process of crushing.

Information regarding the yield of green leaves per acre is variable. The first plucking should give three thousand pounds of leaves, gradually increasing to a maximum of ten thousand pounds. The yield of gutta is given as 1.5 per cent to 1.8 per cent of the freshly picked leaves. The leaves are chopped up in a machine while in a fresh state, and then crushed between rollers. The pulp obtained is treated with boiling water for the purpose of separating the dirt and refuse from the gutta. This process is repeated several times, when the gutta is removed and pressed into blocks.

One of the greatest difficulties in establishing a gutta-percha plantation in the cultivation of "taban merah" is the fact that seed is not easily obtainable in large quantities and deteriorates rapidly, losing its germinative power in about two weeks. "Taban" does not produce seed until at least fifteen years old. Propagation by cuttings has not proved a success, so production from seed is necessary. Owing to accidental cross-fertilisation there is no certainty that plants derived from seeds of the "taban merah" tree will come up, and the variety is the valuable one. Generally about 10 per cent of the seeds are spoilt, 10 per cent do not germinate, and 40 per cent do not give suitable plants, so that only about 40 per cent of the seeds give plants fit to put in the fields, and of these one-third have to be renewed. The Telegraph Construction and Maintenance Co., Ltd., a leading British submarine cable manufacturing concern, has done pioneer work in establishing plantations.

THE GUTTA-PERCHA TRADE OF SINGAPORE.—The centre of the trade in gutta-percha is at Singapore. It is there roughly sorted and classified and often bulked and reboiled, and shipped principally to European users. The business is in the hands of the Chinese. There is no clearly defined classification or grading, and parcels purchased may vary considerably.

110 RUBBER, TEA, COFFEE AND SPICES

The material, when received, consists of four constituents—gutta, resin, dirt, and moisture, in varying proportion. Practically all the gutta-percha produced in Borneo, the Federated Malay States, and the Unfederated Malay States, as well as much foreign-produced gutta-percha, passes through Singapore, so that the statistics about to be quoted represent supply from all quarters. It must be remembered that the material goes through a considerable amount of treatment before being reshipped from Singapore.

GUTTA-PERCHA TRADE OF THE STRAITS SETTLEMENTS

	1913	1921	1922
Imports (tons)	2976	808	534
Exports „	4171	1363	2080
Imports (value)	£272,815	£172,872	£106,331
Exports „	£552,104	£398,833	£329,616

The shipments in the pre-War year, 1913, as it happens, were exceptionally high; the average for the decade would be about 3000 tons, a figure which was exceeded in 1920 (3548 tons, value £936,071).

The most noticeable feature in the above table, however, is the discrepancy between imports and exports, the former being much the smaller, although, strictly speaking, there is no local production of gutta-percha in the Straits Settlements. An excess of exports is to be found for every year for which the statistics can be traced back.

The explanation may, perhaps, be found in the following table of imports and exports of “gutta-inferior” :—

SINGAPORE TRADE IN GUTTA—INFERIOR

	1913	1921	1922
Imports (tons)	11,420	3570	4398
Exports „ „	9,217	2338	2530
Imports (value)	£193,587	£71,805	£110,382
Exports „	£169,291	£96,683	£91,864

Since the exports are here less than the imports both in quantity and value, the presumption is that a considerable amount of produce which comes into the Colony as gutta-inferior goes out of it as gutta-percha.

The expression “gutta-inferior” is understood to include jelutong (a product which has many aliases) and a host of minor produce of the jungle. These are all products that go through treatment at the Singapore reboiling factories, and it would be natural to expect the bulk to be somewhat reduced before shipment from Singapore (by the weight of the moisture, resin, and dirt extracted), but the value to be enhanced.

The destinations of exports of gutta-percha from Singapore in 1922 included (principal countries only) :—

	Tons.	£
United Kingdom	534	201,067
United States	1235	87,749
Germany	157	11,068

It may be gathered that the British submarine cable manufacturers took the best of the gutta-percha and paid much the highest price for it.

AVERAGE PRICES.—Average annual export prices of gutta-percha at Singapore in recent years have been¹: (Five years, 1912–16) 47·09, (1917) 41·64, (1918) 36·11, (1919) 116·11, (1920) 134·60, and (1921) 149·29. Values: (December, 1923) gutta-percha, fine red, \$450 per picul; First quality mixed, \$350 per picul; Medium, \$200 per picul; Lower, \$50–100 per picul.

14. THE JELUTONG TRADE OF BRITISH MALAYA

Singapore is also the market and shipping centre for jelutong, otherwise known as “Pontianak” or “Dead Borneo.” No separate statistics are kept for this commodity in the Straits Settlements, but it is included among gutta inferior in the statement of exports given above. The principal destinations of the exports of gutta inferior (including jelutong) in 1922 were:—

	Piculs.	\$
United Kingdom	695	16,842
United States	39,063	706,853
Japan	2,304	55,329
Other Countries	449	8,396
	<hr/> 42,511	<hr/> 787,396
	2,530 tons	£91,864

No doubt the principal part of the above total consists of jelutong. The jelutong shipped from Singapore includes not only produce from the mainland of British Malaya, but also supplies received from the British Colonies in Borneo and from various parts of the Malay Archipelago.

The jelutongs are scattered trees growing to enormous sizes and are among the tallest of the jungle trees. They belong to the genus *Dyera* and there are probably several species. In Malaya, *D. Costulata* and *D. Laxiflora* are recognised, the former having a reddish bark when cut and the latter a whitish bark. The former is said to contain much more juice than the latter. Both species grow scattered in the valleys and on the hills of Malaya to a height of 500 feet or more, but seldom in swampy land.

The jelutong latex as collected from the tree gives about 22·5 per cent by weight of dry coagulum. The resin content of the dry jelutong amounts to from 75–80 per cent, and the rubber content is 20–25 per cent. It is used to a certain extent in rubber manufacture (principally, it is believed, in American rubber-shoe factories) and has been applied as a damp-proofing. More recently the shortage of chicle gum has led to a factory being erected in Pahang (one of the Federated Malay States), where it is hoped to refine jelutong to such an extent as to make it suitable for the manufacture of American chewing gum.

¹ In Straits dollars and cents per picul of 133½ lb.

15. THE GUTTA-PERCHA AND JELUTONG INDUSTRIES IN BORNEO

GUTTA-PERCHA IN BORNEO.—The gutta-percha industry of British North Borneo and Brunei has sunk into unimportance, so there is only Sarawak to consider in this connection. The exports in recent years have been :—

EXPORTS OF GUTTA FROM SARAWAK

	1920	1921	1922
Gutta-percha (piculs) .	436	1181	883
„ (value) .	\$139,868	\$229,569	\$205,996
also			
Gutta jangkar (piculs) .	1164	3382	3601
Leaf gutta „ .	149	120	57
Gutta Sangai „ .	262	161	160
Gutta Siak „ .			172

All this produce is shipped to Singapore. The best Sarawak gutta-percha is prepared by the up-river tribes by frequent boiling and beating on wooden slabs, so that the article as marketed by them is practically pure gutta-percha. The finest can easily be recognised as the slabs are in the shape of isosceles triangles about an inch thick, the apex being finished off with a curl, forming a ring by which the slabs can be slung on a string and easily carried.

GUTTA-JANGKAR.—This is an inferior gutta selling at about \$30 a picul when No. 1 gutta-percha is at \$400 a picul. It is obtained from a tree which is quite common in the swamps and low ground of Sarawak. To obtain the gutta the tree, which varies from 6 inches to 2 feet in diameter, is felled as near the ground as possible. The bark is then ringed at intervals of 18 inches, and under each ring a small cup made of bark is placed. Into this the latex drips. When the latex has finished exuding it is collected and put into a bark trough full of water, under which a fire is lit and kept going till the lumps of gutta soften. A quantity of the bark of the “samac” tree is steeped in the hot water, turning it a dark red; when the gutta has been thoroughly softened and reddened it is taken out and moulded on a slab of wood into slabs or blocks of the desired shape and size and allowed to harden, when it is ready for the market. As taken to the market by the natives in slabs and blocks of all sizes and shapes the gutta is full of quantities of bark chippings and dead leaves. The cleansing process is left to the Chinese purchasers.

There are other guttas too numerous to mention, and blends of some with others. Several are derived from creepers.

JELUTONG IN SARAWAK AND BRUNEI.—The principal sources of jelutong in British Borneo are Sarawak and Brunei. The exports in recent years have been :—

	Quantity.		Value.	
	1921 Piculs	1922 Piculs	1921 \$	1922 \$
From Sarawak :				
Jelutong	48,435	60,604	307,634	516,193
Refined Jelutong	4,874	5,034	112,260	142,864
From Brunei :				
Jelutong	7,296	8,682	31,017	46,107
	<hr/> 60,605	<hr/> 74,320	<hr/> 450,911	<hr/> 705,164
	<hr/> = 3,600 tons	<hr/> = 4,424 tons	<hr/> = £52,606	<hr/> = £82,268

MODE OF SALE AND SHIPMENT.—Shipment is made to Kuching in steamers and schooners. On arrival it is usual for the shipment to be tendered for ; the prices form the local market rate until the next shipment arrives. At Kuching it is packed in standard cases (size, 1 ft. 6 in. by 2 ft. 3 in. by 2 ft. 9 in.) and weighing picul. 2·60 including tare ; freight to Singapore (where the output is all sent) is 65 cents a picul, or \$1·69 a standard case, and Export Duty 90 cents a picul. There is 60 to 70 per cent of moisture in raw jelutong at the time of shipment. The London quotations for Sarawak jelutong was £34 per ton c.i.f. (December, 1922) ; £33 per ton c.i.f. (December, 1923).

REFINED JELUTONG.—Considerable quantities of raw jelutong are being “ refined ” in Sarawak by Chinese traders. The process employed is a crude one, and it is doubtful whether it improves the product. At any rate, this refined jelutong is a very different article to that (containing 90 per cent rubber) turned out some years ago by the United Malaysian Rubber Company at its factory at Goebilt (Sarawak)—since closed owing to the liquidation of the Company.

METHODS OF EXPLOITING JELUTONG.—The jelutong tree—indigenous to Sarawak and Brunei—is found in old jungle in swamps at the foot of hills ; it has not yet been cultivated and there are still large districts where the trees are in sufficient quantities to provide employment for numbers more than are now employed in this industry.

The work would appear to be particularly suited to the native population, who are not possessed of much capital, a worker’s outfit being of very little expense to him ; however, with the usual improvidence of the Malay, these people generally require advances of cash from a Chinese trader before they will work jelutong.

A journey is made by boat to a likely district on the banks of a river and search is made in the jungle at the chosen spot ; if a clump of trees is found near at hand a path is cleared to the banks, the felled trees, being laid end to end, form a path through the swamp, which is again joined up by a path of felled trees. This system continues until from 250 to 350 trees have been discovered and joined up ; this working is sufficient for one man and is known as a “ Jelutong Path.” The owner registers his path at the nearest Government station and is granted a permit, when it becomes his property so long as he works it. The tapping of jelutong trees is supervised by Government, which

provides inspectors to see that tapping is carried out according to regulations and also that all owners and workers are registered. Previous to this control the natives preferred to tap the tree to death to secure a quick profit for himself, with no thought to the future ; in fact, he even felled the trees so as to extract as much latex as possible in a short time.

Having registered his path, the owner employs tappers if he has discovered a large supply of trees, but 250 to 350 trees will provide work for one man ; 40 to 50 trees can be tapped in one day, and the tapper passes from section to section until the whole " path " has been tapped ; by the system a tree is tapped once in seven days. The gouge tapping knife is used and the tree is tapped on the herring-bone system ; having tapped his 40 to 50 trees, starting at seven o'clock in the morning, at eleven o'clock he starts collecting ; for this purpose he uses an ordinary 4-gallon kerosene-oil tin slung on his back. The latex, after tapping, runs into bamboo " cups," but if these are not conveniently available cloth bags are used. The coagulating sheds are usually built at a convenient position on the river bank, where the worker sleeps and lives. Here the gathered latex is poured into a tub and coagulated with a mixture of gypsum and kerosene oil. The coagulent and latex are stirred together for ten minutes and then left till the next morning, when the coagulated jelutong is made up into cylindrical or square blocks.

16. GUTTA-PERCHA FROM NIGERIA

The so-called gutta-percha exported from Southern Nigeria is a product obtained from the shea butter tree. The exports in 1922 and in the pre-War year were as follows :—

	1913 Tons	1922 Tons
To United Kingdom	59	6
„ U.S.A.	—	21
„ Germany	15	—
	—	—
	74	27
	—	—
Value	£4425	£1808

17. THE BALATA INDUSTRY OF BRITISH GUIANA

When we speak of " gutta " nowadays, we mean as often as not balata. In view of the shortage of high-grade gutta, balata has very widely supplanted the former, on the general principle that while the best gutta is (broadly) superior to the best balata, there is very little high-grade gutta, but a very fair supply of good balata. Whereas gutta-percha is preferred for submarine telegraph cables, balata makes the best dielectric for submarine telephone cables, by reason of a peculiar electric property which it possesses in relation to currents of high frequency. Its other uses in connection with belting, etc., have already been mentioned. The best balata comes from British Guiana.

EXPORTS OF BALATA FROM BRITISH GUIANA

	1913	1921	1922	1923
Quantity .	1,346,122 lb.	1,390,402 lb.	912,320 lb.	1,026,368 lb.
Value .	£162,794	£203,624	£123,017	(not available)

The present (January, 1924) freight rate on Balata from Georgetown to United Kingdom is 100s. per 40 cubic feet.

The crop in 1922 was unusually small; possibly further quantities were sent over the land frontier into Brazil, swelling the exports of that country.

Out of the above total of 912,320 lb. in 1922, 874,476 lb., value \$565,676, was exported to Great Britain, which, as the leading manufacturing country for balata belting, golf balls, and submarine cable, is the principal consumer. The trees from which balata is obtained are scattered through the forest areas, being possibly more abundant in the county of Berbice. Large forests exist in the Upper Essequibo. The trees also occur, though less frequently, in "reefs" composed practically of balata alone. The bulk of the product is probably obtained from one species of tree (*Mimusops globosa*) and its average composition varies but little.

LICENCES TO COLLECT BALATA.—It is estimated that an area of approximately 88,000 square miles of Crown Lands in British Guiana has not yet been disposed of for agricultural or pastoral purposes. The major portion of the easily accessible lands, and a fair proportion of the more interior districts, have been leased for the purposes of collecting balata. The more readily accessible districts are divided in 50 square-mile sections, while in the less accessible districts the sections are approximately 250 square miles each. Licences are issued by the Government for a term not exceeding fifteen years, or during His Majesty's pleasure, conferring the right to collect both balata and rubber on these sections. Each section required a separate licence, and costs a fee of £1 13s. 4d. on application, and an annual rental of £4 3s. 4d., while a royalty of 1d. per pound on all balata and rubber collected has also to be paid. Applicants must give the Commissioner of Lands and Mines a satisfactory security, and in the case of persons holding more than one tract, a security may be given for all the tracts in a maximum sum of £1041 13s. 4d. These licences are issued for collecting only, and do not confer the right of planting any product, while the Government hold to themselves the power to cancel any collecting licence if the land is required for agricultural or mining purposes.

All labourers employed in collecting balata have to be registered. •Under the regulations no balata tree is allowed to be bled which does not measure 36 inches in girth at 4 feet from the ground. Trees may only be bled on one-half of their girth at any one time. No tree can be re-tapped until the previous incisions are completely healed. The size of the incision is also fixed under Crown Land Regulations. For bad work or contravention of the conditions under which the licence is issued, the licensee is held responsible; but he is empowered to, and expected to, prosecute any offending employees. The Government has appointed forest rangers to assist the land officers in inspecting the work of balata collectors.

METHOD OF EXPLOITATION OF BALATA.—The tapping of balata trees is done by means of a cutlass, incisions being made not more than $1\frac{1}{2}$ inches wide, and about ten inches apart, in a "feather stitch" pattern up the trunks of the trees. The latex runs zigzag from cut to cut into a calabash at the base of the tree. The trees are usually tapped on their trunks by means of a bush-ladder, ropes, or stirrups, while spurs have been experimented with. The yields from the trees vary, but trees usually give over 1 gallon of latex per tapping, equivalent to from 4 to 5 lb. of dry balata; the latter is considered a very good yield. The latex is collected from the calabashes into gourds and then taken to the camp, where it is poured into shallow trays (dabrees) which hold from 5 to 30 gallons of latex. The latex gradually coagulates in these trays, and the inspissated balata is taken off in sheets, successive sheets being removed until the trays are empty, with the exception of a little mother-liquor. The sheets of balata are hung up over the dabrees to drain, and then in roughly constructed drying sheds until they are dry enough to be despatched to town. The labourers are paid by results, according to the amount of balata collected.

There are two main seasons for the collection of balata. The extremes of both wet and dry seasons are unfavourable, for during the height of the wet season much of the land is flooded, while during the dry season the flow of latex is poor. The dry season is often utilised for prospecting, in order to be in readiness for the next collecting period. During recent years considerable discussion has taken place respecting the economy of the various methods employed for obtaining the latex from balata trees. The Venezuelan method of tapping, which involves the cutting down of the tree, was held by many to give yields of balata superior to those obtained from the method usually practised in British Guiana and prescribed in the Crown Lands Regulations. In order to definitely settle this and other points connected with various tapping methods and the use of specially designed tapping instruments, experiments were inaugurated by the Department of Science and Agriculture and by the Forestry Officer of the Department of Lands and Mines. The closely coinciding data obtained from these experiments clearly demonstrated that the mode of tapping as practised in British Guiana is in every way the most economical, both with respect to the yield obtained and the preservation as far as possible of the trees for further tapplings. The Venezuelan method gives smaller yields in conjunction with the further disadvantage of the entire loss of the tree as a producer of balata.

It has been fairly conclusively proved by the experience of four limited companies which have gone into liquidation that the exploitation of balata areas is not a profitable enterprise for this type of organisation.

On page 117 is a record of prices of British Guiana sheet balata on the London Market. The article maintains a steady premium over the price of Venezuelan block balata.

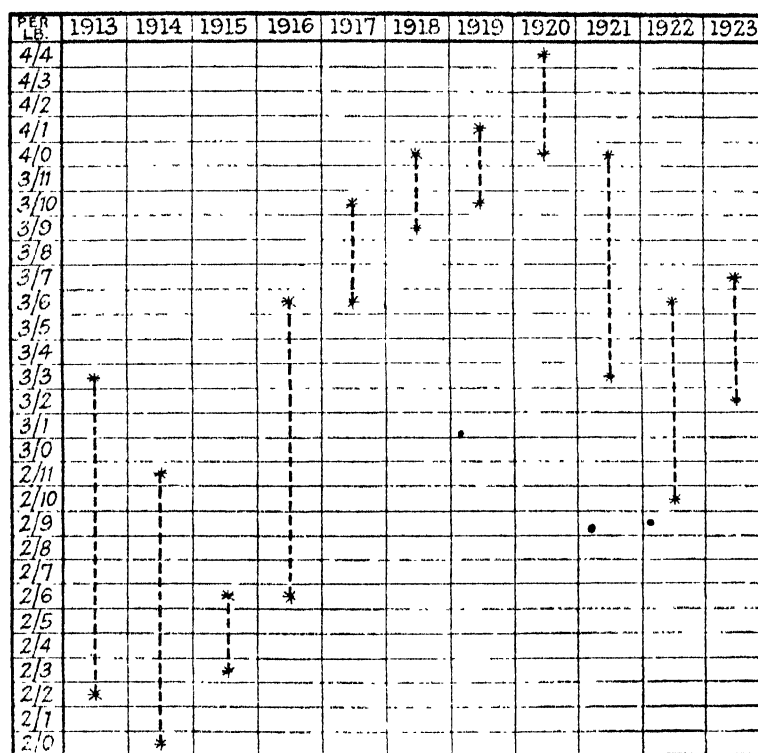
There is very little probability of the output of balata from British Guiana being increased to any great extent, but it is to be hoped that it will be fully maintained. Until recently the only countries in the world producing balata were British Guiana, French and Dutch Guiana, and Venezuela. Within the

last two years, however, a new source of supply has been found in Peru, while some is also coming forward from Brazil. The additional supply will probably be absorbed without difficulty.

18. THE CHICLE INDUSTRY IN BRITISH HONDURAS

Chicle is a crude gum used as the base in the manufacture of chewing gum. The best quality of chicle is produced in the States of Yucatan and Campeche in Mexico, in Guatemala, and in the Northern half of British Honduras. This

HIGHEST AND LOWEST PRICES OF SHEET BALATA FROM BRITISH GUIANA, 1913-1923.



C.I.F. London Values

[Courtesy, Hale and Son.]

gum is derived from the sapodilla trees which grow in the mahogany forests. The average yield is from two to six pounds per tree, the maximum yield for certain regions having been stated at 25 lb., but in Mexico and in British Honduras the yield of gum per tree is reported to have reached as high as 61 lb.

The chicle season extends from the 1st July to the end of June. In July, the beginning of the rainy season, the trees are tapped for the gum, which is then boiled, kneaded, and moulded into blocks weighing 30 lb. each, and sent to the port of shipment. Practically all of the chicle from the three principal countries is shipped from the port of Belize in British Honduras. The first shipment of chicle

to the United States from British Honduras was in 1892. Within a few years the Industry in British Honduras had assumed important proportions and has continued to develop to such an extent that it now holds first place in respect to the value of exports and as a source of revenue to the Government on account of the export duty. In 1896, 925,199 lb. of chicle was exported from British Honduras, and in 1922 exports amounted to 2,032,102 lb. The highest peak in the interval was reached in 1920, when 3,690,641 lb. was exported.

CHAPTER VIII

FINAL SURVEY OF THE POSITION AND OUTLOOK
FOR THE BRITISH RAW RUBBER INDUSTRY

Acreeage of Existing Plantations and their Potential Productive Power. Cost of Planting Up. The Competitive Position of the British Rubber Planting Industry. Costs of Production. Plant Selection and Budding. Propaganda to Increase the Sale of Rubber Goods. Rubber Latex and Sprayed Rubber.

SUFFICIENT information has been given in the course of the geographical survey of the British rubber-producing countries and in the antecedent chapter to make it clear that the productive capacity of British rubber plantations in conjunction with the output coming from the Netherlands East Indies had during 1921 and 1922 far outrun the requirements of consumers. This, as has already been seen, led to the introduction in Malaya and Ceylon of the regulation of rubber exports by legislative enactment.

During the continuance of the export regulation regime there can be no question of any (except purely temporary) over-production. The export quota is revised every quarter.

The production from foreign-owned estates in the Netherlands East Indies and other countries, though important, is not sufficiently large *in esse* or *in posse* to create by itself a situation of over-production. The first year's working under the system of export regulation resulted in the following reduction of shipments from the two countries immediately affected.

	Standard production. Nov., 1922, to Oct., 1923.	Licensed export allowance. Nov., 1922, to Oct., 1923.	Actual net shipments. ¹ Nov., 1922, to Oct., 1923.	Actual net shipments. Nov., 1921, to Oct., 1922.
British Malaya	274,200	166,149	186,332	213,979
Ceylon	60,034	36,770	38,458	46,150
	334,234	202,919	224,790	260,129

For the second exports-regulation year which commenced on November 1st, 1923, a reassessment of the standard production accorded to individual estates is now in progress in British Malaya. This reassessment when completed will take effect as from the beginning of the exports-regulation year. It is being carried on the basis of recommendations made by Advisory Com-

¹ Includes shipments of Stocks on hand when Regulation became Law.

mittees in Malaya. The actual production of an estate in the former standard year ended October 31st, 1920, has practically been scrapped as a measure of productive capacity and a general scale is now applied to all owners of estates of over 25 acres. This scale is as follows :—

Trees planted in 1919	.	.	60 lb. per acre.
" " 1918	.	.	180 lb. "
" " 1917	.	.	240 lb. "
" " 1916 (and previously)	.	.	300 lb. "

The allowance¹ for standard production of an individual estate may, however, be settled by the Assessment Committees at any figure not exceeding 400 lb. per acre for rubber planted in 1916 or previously, provided that owners claiming that their estates are capable of such higher production submit conclusive evidence to that effect. The Assessment Committee¹ is also allowed to accept inspection of the property as a basis for increased allowance.

The allowance of 60 lb. per acre for 1919 rubber is subject to the Assessment Committee being convinced that 60 per cent of the trees have attained tappable size. For holdings of 25 acres and under, the maximum rate of standard production is now 320 lb. per acre of mature rubber. The Chief Secretary at the beginning of each quarter may, however, grant an additional exportable allowance on each of the first five acres of each holding so long as the percentage exportable at the minimum rate of duty does not exceed 80. This additional allowance is not to exceed 4 katis (of 1½ lb.) per acre per mensem and must not raise the total amount exportable per acre per mensem to more than 17 katis. For areas in bearing but not mature, half the rates and allowances on mature rubber is granted. The District Officer, moreover, has power to award a lower rate of standard production than the maximum above stated when in his opinion the land is not reasonably and efficiently cultivated.

The new scale, it will be seen, reduces the standard for trees in their first year of production and fixes lower maxima. On the other hand, additional areas must necessarily have come into bearing since the first year of exports-regulation, and the areas assessed at 120 lb., 180 lb., and 240 lb. in the first exports-regulation year fall into later age classes and rank in the scale for standard production allocations of 180 lb., 240 lb., and 300 lb., respectively, in 1923-24; 240 lb. and 300 lb. in 1924-25. The removal of the limit of 320 lb. per acre on mature rubber owned by young producers and the allowance for this class of producer of claims up to 400 lb. per acre, if fully substantiated, must also be felt.

¹ Such claims for increased allowance may be supported by records of the actual production of the holdings during any twelve consecutive months after 1st January, 1919, or (in the case of newly opened areas) any consecutive six months. They are considered on the basis of a system of tapping which (a) does not exceed one cut on one-quarter of the circumference of the tree daily or its equivalent; (b) permits of a minimum of (i) six years for first bark renewal and (ii) eight years for second and subsequent renewals. Where the whole or part of the area has been tapped on a lighter system than the standard of tapping or the whole or part of the area has been rested periodically during the period on which the claims are based an allowance may be made for such lighter system of tapping and/or rested areas. Where the system of tapping has exceeded the standard the Assessment Committee may make such deduction from the figure submitted as they think fit.

At the time of writing the only official estimate of the total effect of the alterations is that made by the Federated Malay States Central Advisory Committee, which is that the application of the new rules will give a total standard production less than that which would have resulted from the continued application of the old rules; this is a different thing from saying that they will necessarily lead to an actual reduction in the standard total production as compared with the first exports-regulation year.

During 1923 the large stocks of rubber in European and American ports, as well as in the East, to which the Stevenson Committee drew attention in its report, were reduced considerably—probably by 50,000 tons—and the present position¹ and the outlook for the immediate future, is that the producer is assured a margin of profit on his regulated export production, while the consumer is equally assured of an additional supply rising 5 per cent of the standard for every quarter during which the price of ribbed-smoked sheet has been maintained at 1s. 3d. per lb. or over; in addition, he has the present stocks to work on and a promise of a 10 per cent increase on the standard production for each quarter during which the price remains at 1s. 6d. or over. This may be put as follows:—

Price remaining at 1s. 3d. or over : 2nd quarter 65 per cent of standard, 3rd quarter 70 per cent, 4th quarter 75 per cent, 9th quarter 100 per cent.

Price remaining at 1s. 6d. or over : Advances of 10 per cent from starting-point.

In these circumstances, since the potential capacity to supply the rubber, if needed, is present, it will be well to transfer attention from the immediate to the more distant future, and to enquire regarding the ability of the existing plantation industry to satisfy whatever demand may be forthcoming a few years ahead, and also into the question generally of the factors influencing future production.

ACREAGE OF EXISTING PLANTATIONS.—The acreage of existing plantations (summarised from particulars given in the geographical survey) is as follows:—

	Total planted. Acres.	In bearing. Acres.
Malaya	2,226,236	1,316,831
Ceylon	404,375	390,000
South India and Burma	124,282	61,080
British North Borneo	58,324	35,000
Brunei	2,685	1,488
Papua, Trinidad, British Guiana, etc.	10,449	10,449
Uganda	14,877	10,619
	2,841,228	1,825,467

To these figures there has to be added the total for the rest of the world, and as there are nearly 900,000 acres planted in Dutch Indies exclusive of native holdings, it seems reasonable to conclude that the area outside the Empire is at least 1,100,000 acres, which brings up the total to over 3,900,000 acres.

It will be seen, therefore, that there is a reserve area planted, but not in bearing, in the British Empire, equal to five-ninths of the present² bearing area.

¹ Commencement 1924.

² 1921 acreage in bearing taken as close enough for practical purposes to present bearing area.

This is the second provision against increased demand. The first, of course, is the gradual relaxation of the Export Regulation percentages as the need, reacting on price, is felt.

A third provision against greater requirements by the user is the natural increase in yield expected from well kept-up plantations to a certain age at least.

In addition, there are young areas in the Netherlands East Indies to come into bearing, and while full information regarding these is not available, it is a general opinion that they will more than counteract the effects on output of over-tapping*and excessive bark consumption as at present practised on many estates. There is no general agreement of opinion regarding the probable output from all the plantations at present existing in the East when at full maturity, but a figure of 336 lb. (3 cwt.) per acre represents a working hypothesis. Taking the full-planted acreage at present at 2,900,000 acres for the British Empire and 1,100,000 acres for the rest of the world, including native plantations, this would give a potential output of 585,000 tons in a few years' time. An estimate of 392 lb. (3½ cwt.) per acre, which represents maximum expectations, on a similar basis would give an output of 682,500 tons. Even at the low rate of 280 lb. (2½ cwt.) per acre the output would come to 487,500 tons.

Crop per acre.	Appreciation.	Equal to
280 lb. (2½ cwt.)	Low.	487,500 tons plus wild rubber.
336 lb. (3 ")	Fair expectation.	585,000 " " "
392 lb. (3½ ")	Maximum ¹ (believed overestimated).	682,500 " " "

Existing level of consumption about 400,000 tons.

Whether the middle figure is more or less than the world is likely to require is a question which lies far beyond the scope of the present volume since it would entail bringing under review the outlook for the motor-car industry (on which tyre sales are contingent) and the prospects of many other industries—all important as rubber users.²

It shows, at all events, an ample margin over present requirements, and planters, with their recent bitter experience, will require some substantial indication, such as that afforded by the movement of prices, before they again embark on extensive planting programmes. Hitherto, planting development has advanced at a more rapid rate than consumption, but it is possible that the check which has been administered to the former may enable the latter to catch up.

COST OF PLANTING UP.—In any case, capital will not be attracted to "planting-up propositions," as they are called, until it is cheaper to plant than

¹ Mature rubber in Malaya (see p. 66) gave about this figure in 1919-20, but this was on a system of tapping now abandoned as leading to lower subsequent yields; moreover, yields in Malaya, as a rule, are higher than in most other countries.

² There must be a saturation point beyond which new cars purchased go to replace old cars, and the United States, the principal motor-car using country, must be approaching this point. In other countries, of course, there are vast possibilities of development in the use of motor-cars. Lord Montague, perhaps the leading authority on this subject in Great Britain, recently prophesied an increase in the United Kingdom from a million to over four million cars in a few years.

to buy shares in existing plantations already in bearing. This is self-evident. At the present time shares in many established planting enterprises with a known history, and again—since the introduction of the Export Regulation scheme—paying dividends can be acquired to show a capital cost of two-thirds or less of the cost of planting. The above estimate is known to be on the safe side, but great difficulty has been found in obtaining actual data (i.e. estimates made for working purposes) on the cost of planting-up an estate to-day. This for obvious reasons—because planting up has not been practical business. However, the requirement which the editor of this volume laid down—that the estimate should have been made originally for the purpose of work actually contemplated (a deferred extension since abandoned)—was eventually satisfied by the provision of figures for an estate in Sumatra. Though outside the British Dominions, conditions in Sumatra closely parallel those in the more expensive parts of British Malaya, and the illustration comes on aptly to reinforce some remarks that will be made later regarding the competitive position of the British Rubber Planting Industry.

It will be observed that the cost per acre works out at £83 16s. 8d., inclusive of 5 per cent allowance for interest to the fifth year on the increasing investment. Whether at the end of that time the revenue-producing capacity of the estate would be sufficient to provide for the payment of a dividend at this minimum rate would depend, of course, on the price of rubber, but having in view the higher costs of production associated with young rubber just coming into bearing, it would be safer to make some further allowance for interest during non-dividend paying period—say to the seventh year.

Preliminary expenses of forming a company, issuing and advertising prospectuses, etc., have not been included in the estimate, and working capital sufficient to carry on the business of producing rubber after the fifth year would, of course, be required. The latter is not, strictly speaking, an expense, but it is a necessity. Including everything, therefore, the estimate points to the need of about £100 eventual paid-up capital per acre for a planting-up proposition at the present day.

FIRST YEAR			
<i>Opening Expenditure—</i>		Changkolling and eradica-	
Cost of leasehold land, 2,000	£	ting roots and stumps at	£
acres at £5	10,000	£10 per acre	20,000
Recruiting and organising		Establishing nurseries	1,000
labour force of 500 coolies			37,000
at £10 per head	5,000	<i>Upkeep—</i>	
Bungalows	2,500	Weeding at £1 10s. per acre	3,000
Coolie lines	2,500	Supplying at 10s. per acre	1,000
Sundry buildings	1,000	Roads, bridges and drains at	
Furniture	300	10s. per acre	1,000
Carts, live stock and/or me-		General cultivation at 10s	
chanical transport	1,000	per acre	1,000
Implements and tools	1,000	Diseases and pests	200
	23,300	Upkeep nurseries	200
<i>Planting, etc.—</i>		Implements and tools	200
Felling, heaping and burning,			6,600
lining, holing and planting		<i>General Charges—</i>	
at £8 per acre	16,000	Salaries	1,400

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Visiting agent and local agency	£	500	£
Upkeep carts, live stock and transport		250	
Sundry goods and furniture, etc.		250	
Medical and sanitation expenditure		1,500	
Postages, telephone, telegrams, stationery		100	
Sundry expenditure		500	
Rent		300	
Insurance		100	
Head office and directorate		1,000	
		<u>5,900</u>	
First year's expenditure		72,800	

SECOND YEAR

<i>General Charges—</i>			
As for first year plus £150 salary increases		6,050	
<i>Upkeep—</i>			
Weeding £2 per acre £4,000			
Supplying 10s. per acre 1,000			
General £1 per acre . 2,000			
Roads, drains, etc., 10s. per acre . . 1,000			
Diseases and pests . . 200			
Upkeep nursery . . . 200			
Tools and implements . 200			
Upkeep buildings . . . 200			
		8,800	
		14,850	

THIRD YEAR

<i>General Charges—</i>			
As for second year plus £150 salary increases		6,200	
<i>Upkeep—</i>			
As for second year plus £50 extra for buildings upkeep		8,850	
		15,050	

FOURTH YEAR

<i>General Charges—</i>			
As for third year plus £150 salary increases		6,350	

<i>Labour—</i>			
Re-engagement of 400 coolies at 8s. per head, repatriation of 100 coolies at £3 per head, recruiting 100 coolies at £10 per head	£	1,460	£
<i>Upkeep—</i>			
As for third year plus £50 extra for buildings upkeep and £50 extra pests and diseases		8,950	
		16,760	

FIFTH YEAR

<i>General Charges—</i>			
As for fourth year plus £150 salary increases		6,500	
<i>Upkeep—</i>			
As for fourth year plus £50 extra for buildings upkeep		9,000	
<i>Buildings—</i>			
Rubber factory and machinery, £6,000 ; smokehouse and drying shed, £500		6,500	
		22,000	

* Total expenditure in bearing 141,460
= £70 14s. 7d. per acre

<i>Add—</i>			
Interest at 5 per cent on first year's expenditure of £72,800		3,640	
Ditto 2 years' expenditure of £87,650		4,382	
Ditto 3 years' expenditure of £102,700		5,135	
Ditto 4 years' expenditure of £119,460		5,973	
Ditto 5 years' expenditure of £141,460		7,073	
		26,204	
		167,664	
			= £83 16s. 8d. per acre.

Two thousand acres is taken as the minimum area for economical working. It is assumed that the land selected is forest land, and that the area would be changkollod and properly cleared of roots and stumps. Experience teaches that this work, if thoroughly carried out, would cost approximately £10 per

acre, but the value of land cleaned in this way is certainly increased by more than that amount.

For the sake of convenience it is assumed that the whole area is felled, heaped and burned, changkollod, stumped and planted with 100 selected rubber plants per acre in the first year. Actually, of course, the planting programme would be spread over several years, but this would not affect the capital cost, which is the point it is intended to elucidate.

European Staff.—Manager commencing at £800 per annum, rising £50 per annum to £1000; two assistants commencing at £300 per annum each and rising £50 per annum to £500.

Buildings.—Manager's bungalow at £1000; two assistants' bungalows at £750 each; five sets of permanent coolie lines, each to accommodate 100 coolies, at £500 each; sundry small buildings, £1000. In the fifth year a permanent rubber factory, equipped with oil engine and three washing machines; also a smokehouse and drying-shed; factory and machinery, including preparation of site, erection, and provision of water supply, £6000; smokehouse and drying-shed, £500.

Labour Force.—Five hundred indentured coolies (three years' agreement) at, say, 9d. per day average. Cost of recruiting and organising the force, £10 per coolie. At the end of three years it is assumed that 80 per cent of the force re-engage and are paid a bonus of 8s. each. The balance of 100 do not re-engage and are repatriated at a cost of £3 each being replaced at £10 each.

As showing the absence of inducement to plant up new acreage at anywhere near the above figure, it may be noted that the *Statist List of Rubber Share Values* at the end of 1923 contains particulars of eleven companies whose shares can be bought at a figure representing less than £30 per planted acre, ten companies the market capitalisation of which is above £30 and below £40 per planted acre, nineteen between £40 and £50, twenty-nine companies between £50 and £60, etc.—and this in a comparatively short list.

THE COMPETITIVE POSITION OF THE BRITISH RUBBER PLANTING INDUSTRY.—Though British rubber plantations are not now harvesting their maximum output, their competitive position—excluding a few estates in Africa and the West Indies and in some parts of Borneo—is good and is likely to be better in the future, since bark is being conserved and the trees are benefiting through resting periods. South India, as has been seen, is somewhat handicapped by low yields, and Burma by a long season of heavy rains, otherwise yields are as good or better than elsewhere. Prior to the introduction of Regulation of Exports, at any rate (sufficient data has not yet been accumulated to enable an estimate to be given of the results of 1923), the Dutch East Indian costs¹ were higher than either Ceylon or the greater part of Federated Malay States. Java ought to work as cheaply as Ceylon; but there is no doubt that, taken as a whole, Ceylon has beaten that country in the past by about 1½d. per lb. The better

¹ The average "all-in" cost during 1922 for 33 companies having estates in the Dutch East Indies and producing 11,257 tons amounting to 9·22 pence per lb.—Report by Symington and Sinclair, rubber brokers.

parts of Malaya are also cheaper than the average Java costs, more especially all the seaboard of Selangor.¹ Inland in the Federated Malay States costs are rather high on account of the estates being less healthy, and in consequence somewhat higher wages are a necessity, also hospital and anti-malarial precautions cost more than at the coast.

COST OF PRODUCTION.—The question of cost of production naturally affects the feasibility of establishing new plantations so long as the price of rubber is low. The expression may mean much or little. The figure, whatever it is, is obtained by dividing the total expenditure of the estate on producing and selling rubber by the number of pounds weight of rubber out-turn. No sum is included for interest on capital. Practice as regards charging depreciation varies, but the main objection to the ungarded use of the figure given in many companies' reports is that the standard of cultivation and upkeep varies and a low cost obtained by comparative neglect of important heads of expenditure may for a time look very like efficiency. During recent years all estates have had no choice but to economise to the last degree, with the result that there is much leeway to make up in the direction of effecting repairs, bringing plantation machinery, equipment, and buildings to a proper state and in connection with estate operations generally. Salaries in some cases have been cut down to a bare level of subsistence and other economies resorted to. Now that money is available it will be spent in remedying these deficiencies; labour charges are also higher than they were in some countries and costs are likely to increase substantially. As between different estates costs vary according to the standard of upkeep considered necessary by each management, and depending on whether they have high yields or low yields, low wages or high wages, healthy or unhealthy situation, and are easily accessible or remote. An estate may have one or all of these benefits or detriments, but generally there are present some detracting elements. The most direct way in which cost of production bears on the question of new planting is that it is much more expensive to tap young trees for a small yield than older trees for a larger yield.

PLANT SELECTION AND BUDDING.—The planting community is interested in the possibility of increasing the yield of individual rubber trees by bud-grafting from selected high-yielding mother trees, and this is the last of the factors that need be mentioned as having a possible bearing on rubber output in the future. A few estates in Malaya have established large areas of budded trees. The recent work, however, of Dutch scientists has shown that numerous difficulties remain to be overcome before this procedure can be relied upon to give satisfactory results on an estate scale, and also that it is unlikely that the excessively high yields once promised by this means will be realised. The work is still in an experimental stage, requiring further investigation. There is, however, every need for the active support of further experimental work.

PROPAGANDA TO INCREASE THE SALE OF RUBBER GOODS.—In view of the fact that potential production of rubber is greatly in excess of current needs the Rubber Growers' Association has raised a considerable sum by

¹ Statements by R. Arnold in the *Bulletin of the Rubber Growers' Association*.

means of a levy on its members, which it has applied to propaganda for the purpose of increasing the sale of rubber goods. A considerable degree of success has been achieved in popularising the crêpe rubber sole, and it is probable that the sale of a variety of domestic rubber goods has been increased through the efforts of the Propaganda Department of the Association. Work of this kind brings its own reward to the rubber growers. The main demand for rubber, however, is for use in mechanical rubber goods and tyres, and since the consumption of rubber for these purposes is incapable of being increased beyond the natural limit formed by the number of motor-cars in commission and the number of machinery installations requiring rubber valves, packings, driving belts, etc., there is no need or opportunity for propaganda in these directions.

Attention, therefore, has been given to discovering and encouraging new uses for rubber and a wide range of suggestions was forthcoming in response to a prize competition recently held by the Association. Under the auspices of a subsidiary company formed for the purpose a number of short stretches of rubber roadway have been laid down in various parts of the metropolis, and it is hoped to prove that rubber as a road-surfacing material, though more expensive in first cost, is cheaper in the long run than other less lasting, noisier, and less sanitary materials. Free gifts of rubber tiling have been made to several hospitals with the object of demonstrating its value for such purposes, and a general propaganda has been made in favour of rubber flooring, of which several new types are being manufactured.

These efforts at least show that the rubber-growing industry is awake to the advantage of finding new uses for rubber.

RUBBER LATEX AND SPRAYED RUBBER.—Perhaps the greatest encouragement in this direction is to be found in connection with the development of the demand for latex, viz. the uncoagulated rubber milk as obtained from the tree. It is only recently that latex has been shipped from the East on a commercial scale, and hitherto the great bulk of the shipments has been made from Sumatra, which exported 228,324 gallons in the whole of 1922, and from 200,000 to 260,000 gallons monthly during the latter part of 1923. Shipments from Malaya amounted to 40,061 gallons in the last seven months of 1922, and a considerably larger quantity in 1923.

The latex, before shipment, is treated with a preservative (ammonia), and is then available for direct use for such purposes as impregnating cloth, cord tyre fabrics, etc. Moreover, a cold process of vulcanizing the liquid latex has been developed.

These are not so much new uses as new processes which may lead to new uses. An actual new use proposed is the manufacture of latex paper (ordinary paper containing a small percentage of latex). Such paper can now be obtained and for some purposes is said to offer distinct advantages.

Contracts for the sale of their whole estate's production as liquid latex at a price based on the ruling market price of rubber at the time of delivery have been made by several plantations, which thus save the cost of manufacture into sheet or crêpe. The latex so sold is for shipment direct to the United

States or for treatment in local spraying plants—another development of the past year—before shipment.

“Sprayed rubber” is still so much of a novelty that no opinion can be hazarded regarding the place it will take in the rubber industry of the future. It is made by delivering the liquid latex on to a disc revolving at a high velocity in a chamber supplied with a constant current of warm air. The rubber is sprayed off the disc in small particles, which collect on the floor of the chamber in the form of rubber snow, the deposit being then collected and pressed into blocks.

STATISTICS BEARING ON RUBBER CONSUMPTION

MOTOR VEHICLE PRODUCTION IN THE U.S.A.

	Motor-car and Truck Production.	Motor-car and Truck Exports.	Motor Vehicle Registration. (end of year)	Increase in Motor Vehicle Registration.
1914	569,045	29,090	1,768,963	520,907
1915	892,618	37,876	2,494,912	725,949
1916	1,583,617	77,499	3,584,567	1,089,655
1917	1,868,947	80,785	4,992,152	1,407,585
1918	1,153,637	47,244	6,105,974	1,113,822
1919	1,974,016	82,730	7,596,503	1,490,529
1920	2,205,197	171,744	9,206,510	1,610,007
1921	1,668,550	38,430	10,505,630	1,299,120
1922	2,586,049	79,671 ¹	12,364,377	1,858,747
1923	4,009,323	162,733 ¹	15,281,295 ²	2,916,918

MOTOR VEHICLE REGISTRATION IN GREAT BRITAIN

	31st December 1921.	31st December 1922.	31st December 1923.
Cars (including taxis)	326,000	366,003	460,896
Commercial vehicles	135,000	158,856	181,235
Motor cycles	355,000	352,340	391,087
	816,000	877,199	1,033,218

WORLD'S MOTOR VEHICLE REGISTRATION

17,748,074 vehicles (excluding motor cycles).

(Includes 1923 figures for United States of America and Great Britain, and earlier—principally 1922—figures for other countries. Canada, 487,009; Australia, 97,189; Union of South Africa, 35,500; New Zealand, 34,500; India, 54,415; France, 290,303, etc.)

¹ Eleven months.

² Equals one motor vehicle to every 7 persons.

SECTION II

TEA, CACAO AND COFFEE

THE THREE GREAT BEVERAGE GROWTHS OF THE EMPIRE

ARRANGEMENT OF THE SECTION

TEA. General Survey, p. 130; Geographical Survey: India, p. 142; Ceylon, p. 152; Malaya, p. 160; Natal, p. 161; Nyasaland, p. 161.

CACAO. General Survey, p. 162; Geographical Survey: Africa, p. 170; Ceylon, p. 193; W. Indies, p. 186; Oceania, p. 196.

COFFEE. General Survey, p. 198; Geographical Survey: India, p. 207; Ceylon and Malaya, p. 210; Africa, p. 211; Aden, 220; West Indies, p. 223.

CONCLUSIONS ON THE SUBJECT, p. 225.

INTRODUCTORY NOTE TO THE SECTION

As every one must realise who has had the choice offered him, "Will you take Tea, Coffee or Cocoa?" the three commodities with the production and marketing of which, in the British Empire, this Section is concerned, are competitors for the public favour. Except in countries where they are displacing beer or other drinks, it tends to be the case that an extension of the use of one beverage is followed by a decrease in the consumption of one or both of the others. Setting aside the undeveloped markets, a general increase of consumption (taking the three commodities as one) can only take place through an increase in the number of meals per diem at which a beverage is served. Such a change has been brought about by the general adoption in Great Britain, within quite recent years, of the custom of afternoon tea, and the office cup of cocoa in the morning is probably getting more usual. The British institution of afternoon tea is also being copied abroad.

These well-known facts suggest an examination of the tea, coffee and cocoa consumption per head in different countries as the most fitting preface to the present Section.

TEA, COFFEE, AND COCOA CONSUMPTION PER HEAD IN THE UNITED KINGDOM

	Tea. lb.	Coffee. lb.	Cocoa. lb.	Total. lb.
1840 . . .	1·22	1·08	·08	2·38
1850 . . .	1·86	1·13	·11	3·10
1860 . . .	2·67	1·23	·11	4·01
1870 . . .	3·81	·98	·20	4·99
1880 . . .	4·57	·92	·30	5·79
1890 . . .	5·18	·77	·54	6·49
1900 . . .	6·07	·70	·94	7·71
1910 . . .	6·31	·80	1·50	8·61
1920 . . .	8·35	·82	2·66	11·83
1921 . . .	8·68	·81	2·36	11·85
1922 . . .	8·66	·86	2·51	12·03

For a brief interval during the War, coffee consumption rose to over 1 lb. per head and tea consumption declined a little, probably owing to difficulty in getting supplies.

PER CAPITA CONSUMPTION OF TEA, COFFEE, AND COCOA IN THE DOMINIONS AND FOREIGN COUNTRIES¹

	Tea.		Coffee.		Cocoa.	
	1909-13 lb.	1921-22 lb.	1909-13 lb.	1921-22 lb.	1909-13 lb.	1921-22 lb.
Australia • . .	7.5	6.1		.6	.3	1.1
Austria . . .	.1	.1½	4.4	1.7	.4	1.2
Belgium . . .	.1	†	10.5	11.2	1.7	2.6
Canada . . .	5.0	4.3	1.7	2.3	.6	2.0
Denmark . . .	.4	.2	11.6	14.5	1.4	1.7
Finland . . .	.1	†	9.1	8.7	—	—
France . . .	.1	.1	6.2	9.2	1.2	2.1
Greece . . .	†	.2	.9	2.4	—	—
Hungary . . .	.0½	.1	1.2	.8	.6	.5
Italy . . .	†	†	1.7	2.7	.1	.3
Netherlands . .	1.9	3.8	16.1	10.7	9.4	10.5
Norway . . .	.1	.1	12.1	13.0	.9	2.4
Portugal . . .	—	—	1.1	.8		
South African Union	.9	1.2	4.3	4.2		
Spain . . .	†	†	1.5	2.1	.7	.8
Sweden . . .	.1	.1	13.4	13.8	.5	.9
Switzerland . .	.3	.3	6.5	7.8	5.4	2.7
U.S.A. . . .	1.0½	.8	9.3	12.0	1.4	2.9

† Negligible.

In the case of cocoa, these figures may give a wrong impression. The method of dividing the net imports of raw cacao (in lb.) by the population of the country shows, it is true, the amount of cocoa preparations manufactured in that country per head of population, but this does not necessarily mean that these are finally consumed there, and it leaves out of account the consumption (if any) of imported cocoa powders, etc. It is noteworthy that South Africa is the only great coffee-drinking country in the Empire, though the consumption, both of coffee and cacao, has made much headway in Canada at the expense evidently of tea. Great Britain and Australia are the great tea drinking countries.

Comparing the pre-War quinquennium with 1921-22 the most notable feature is the growth in the consumption of cocoa, which for this purpose includes eating chocolate.

NOTE : The term cacao is used in this book to describe the *cacao tree*, which yields the *cacao bean*, which is the raw material for *cocoa powder* and cacao butter (or cocoa butter but the former term is preferable to save confusion with coco-nut butter, also called cocoanut butter).

¹ Compiled by the *Tea and Coffee Trades Journal* (New York) on the basis of the 1923 figures of the International Institute of Agriculture (Rome).

CHAPTER I

THE TEA INDUSTRY OF THE EMPIRE

GENERAL ECONOMIC SURVEY, INCLUDING CONSOLIDATED STATEMENTS OF SUPPLY FROM THE EMPIRE AND PRINCIPAL FOREIGN PRODUCING COUNTRIES

[Revised for general data to January, 1924 ; statistics complete to end of crop year 1922-23.]

Tea Cultivation : Black Tea. Green Tea. Tea Qualities and Flavour. Production of Tea in the British Empire. Imperial and World Consumption of British Teas. U.K. Consumption and Colonial Preference. Recent History of the British Tea-Growing Industry. Method of Handling Imported Teas. Importers' Charges on Tea. Tea Auctions. Conditions of Sale of Indian and Ceylon Teas. Sales by Private Contract, including Forward Sales. Tea Clearing House.

IN the British Empire tea cultivation is carried on upon a large scale in India and Ceylon, and on a smaller scale in Nyasaland and Natal. In the rest of the world China, Japan, Formosa, Java, and Sumatra are large producers, and there is a small tea industry in the Caucasus near Batoum and in French Indo-China.

The tea of commerce consists of the cured young leaves and tender tips of shrubs belonging to either of two distinct varieties or races of *Camellia thea*, viz. *Camellia thea* variety *viridis* and *C.T.* variety *Bohea*. To the variety *viridis*, a variety of North-Eastern India, are considered to be traceable the races "Assam Indigenous" and "Manipur," as well as many cultivated varieties of these widely planted in India, Ceylon, and Java. The China tea (variety *Bohea*) is distinguished by its squat struggling habit and comparatively small leaves ; it is the tea plant chiefly grown in South China, and is cultivated on some of the higher estates in Ceylon, being hardier than, but not so productive as, the Indian kinds named. The "Assam Hybrid" is considered to be a natural hybrid between the "Assam" and "China" teas. Left to itself, the Assam tea is an erect tree, 30 to 40 feet high, but in cultivation it is "tipped" early and kept as a bush, not being allowed to grow higher than about four feet.

CULTIVATION OF TEA.—The tea plant, more especially the Assam tea, is adaptable to a wide range of temperature and various conditions of soils, provided the rainfall is not less than about seventy inches and is evenly distributed ; in Ceylon it thrives from sea-level to over 6000 feet. It will not, however, flourish in dry climates, especially at low elevations. The soil must be well drained ; when humus is deficient it should be supplied by means of green-manuring, as, for example, by planting quick-growing leguminous shade trees which can be lopped frequently, the twigs and leaves being left on the ground to form a mulch, or preferably dug in. Manuring periodically by artificial or cattle manure is practised. Tea seed is obtained from bushes specially cultivated as "Seed bearers." The seeds are usually sown in germinating beds, or

nurseries. The young plants (of 9 to 12 months) are put out from germinating beds in rows usually 4 feet apart and $3\frac{1}{2}$ feet apart in the rows; this works out at about 3250 plants per acre.

At about four years of age the plant reaches maturity,¹ but a year before being plucked it has to be pruned down to about nine to twelve inches from the ground. Full bearing is not reached till the seventh or eighth year. The bushes are plucked regularly every eight or nine days at low elevations, and once every fortnight or three weeks at higher altitudes for two to two-and-a-half years, when they have stopped "flushing" and are again pruned. Plucking is mostly done by female coolies. If it is desired to produce only the most delicate quality, then only the bud and the two youngest leaves are plucked. When a larger yield is required, then three or even four leaves may be plucked from the top of the shoot downwards.

YIELD PER ACRE.—When in full bearing at seven or eight years old, the crop of made tea may, *according to elevation, soil, and degree of cultivation*, be from 350 lb. to over 1000 lb.² or more per acre, 600 lb. being considered a good average yield. *According to policy* it may within the above limits be what the cultivator likes to make it by adopting fine, moderately fine, or coarse plucking. As will be shown later on (p. 137), recourse to finer plucking after a period of coarse plucking had demoralised the market has recently resulted in the rehabilitation of the Industry. Coarse plucking, naturally, yields tea of a lower quality. Pluckers will gather from 20 to over 80 lb. of green leaf in a day, according to the condition of the field and their ability. After plucking, the leaves are conveyed in baskets to the tea factory and carefully weighed and sorted. This latter operation is necessary in order to eliminate the carelessly plucked coarse leaves and pieces of stalk.

Manufactured tea may be divided into two classes: (1) Black tea; (2) Green tea. By far the largest proportion of Indian and Ceylon teas is manufactured into black tea on the estates, but there is also a smaller out-turn of green teas. The difference in the colour and character of black and green teas arises from the different methods of manufacture, though it is true that the teas produced in some districts lend themselves better to the manufacture of green than black tea.

BLACK TEA.—The manufacture of black tea consists of five processes, which the perfection of machinery has made almost automatic—withering, rolling, fermenting, firing, and sorting; while green tea is unfermented, i.e. unoxidized. Every tea estate or group of estates has a factory attached to it where suitable machinery is installed.

The withering process consists of spreading the green leaves on shelves of jute hessian and leaving them to wither for about twenty-four hours. It has

¹ With gardens in the plains (this is in India) in a forcing climate, the plants are expected to yield after the third year a half crop, and to attain to full maturity in the sixth year after planting. Hill gardens are much slower in coming to maturity, while some do not attain till the tenth, or even the eleventh, year. *Indian Tea: its Culture and Manufacture*, by Claude Bald, 4th Ed., Calcutta: Thacker, Spinks & Co., 1922.

² This figure, of fairly common occurrence in the early days of tea planting in Ceylon, is now rarely reached, if ever.

for its object the evaporation of the moisture in the leaf, which loses approximately 50 per cent of its weight. Successful withering depends on good light and a dry atmosphere, experience teaching those in charge just when the leaves must be removed. In the rolling process the sap cells of the leaf are broken, and incidentally the leaves are given the twisted appearance noticeable in the finished product. The leaves are then passed through the roll-breaker, which breaks up the balls or lumps into which the leaves have formed. The leaves are afterwards spread on wooden frames, covered with wet cloths, and allowed to ferment. The extent to which this is allowed to go determines to a large extent the quality of the tea. In firing, which is the next process, the leaf is spread thinly on perforated trays which are passed through a machine where a current of hot air from 180 to 220° Fahr. is forced through them. The leaves when taken out are dry and brittle and black in colour.

After firing, the leaf is graded by means of a sifting machine, the principal grades of commercial tea being Flowery or Broken Orange Pekoe, Orange Pekoe, Broken Pekoe, Pekoe, Pekoe Souchong, Fannings, and Dust. These names are derived from China. When only the bud and the two young leaves are taken, Flowery Orange Pekoe is the bud, Orange Pekoe the tendered leaf and Pekoe the second leaf. Pekoe Souchong is from the third leaf when a bush is medium plucked, and coarse pluckings yield inferior teas known as Souchongs and Congous. But the commercial names have no longer any relationship to particular leaves. The broken leaf of each grade generally yields a stronger tea than the grade itself and consequently demands higher prices.

Packing is usually done by machinery. The lead-lined chest is placed on a platform which oscillates at about two thousand revolutions a minute. The tea is slowly poured into the chests and settles down so that the utmost capacity of the chest is made use of. A sheet of lead is then soldered on top and the lid is nailed on and bound with hoop-iron. The chest is then ready to be transported to the railway station or port of shipment.

GREEN TEA.—Green tea is prepared by steaming the green leaf, instead of withering as above described—omitting the fermenting process. It is graded as young Hyson, Hyson 1 and 2, Gunpowder, and Dust.

TEA QUALITIES AND FLAVOUR.—The quality of tea depends largely on flavour, which is produced chiefly by the presence of a fragrant oil of a volatile nature, about which little is known at the present time. The finest flavoured teas are only produced in certain localities; some of the best come from Upper Assam and Darjeeling. A comparatively small quantity of these "stand-out" teas is produced. To produce such teas a combination of several conditions is necessary; the soil of the plantation and the "jat" (variety or strain) of the plant must be suitable; the climatic conditions at the time of production must be such as conduce to the slow growth of the shoots; and, finally, the leaf must be plucked fine and carefully manufactured. If the weather is not suitable, a garden which has been making choice teas will fail to maintain the highest standard. Moreover, it happens that a garden adjoining one of the favoured ones, while making good tea, will not be able to obtain stand-out flavour, although the jat of the plant and system of plucking and manufacture in the

two gardens may be identical; in such cases it is evident that something is missing in the soil. That the slow growth of the leaf has a considerable bearing on the flavour of the tea is proved by the fact that some of the finest teas in the Darjeeling district are made when green-fly attacks the plant and checks the growth of the leaf, and also that during the autumn, when growth is naturally checked, some fine-flavoured teas are produced throughout Assam and the Dooars. During the rains, when the growth is luxuriant and large quantities of leaf are produced, there is a falling off in quality, due partly to the character of the leaf, and also to the difficulties experienced in the factory in dealing with excessive quantities of wet leaf. In the plains of India generally and in Ceylon, except at the higher elevations, the quality of the tea depends mainly on the care exercised in plucking and manufacturing the leaf; good drinking teas are produced, but without fine flavour. At the higher altitudes in Ceylon fine-flavoured teas are produced.

PRODUCTION OF TEA IN THE BRITISH EMPIRE.—The following table shows the net exports of tea in recent years from the various tea-producing countries of the Empire, and also exhibits for comparison the shipments from other principal tea-producing countries. For the purpose of arriving at a correct estimate of Inter-Imperial and International trade in tea, these figures fulfil all requirements, but it must be remembered that there is also considerable local consumption of teas in their countries of origin. So far as the countries of the Empire are concerned, such information as is available with regard to local consumption is given under the geographical divisions (India, South Africa, etc.).

CONSOLIDATED STATEMENT OF EXPORT SUPPLY OF TEA FROM PRODUCING COUNTRIES
OF THE BRITISH EMPIRE, WITH CORRESPONDING FIGURES FOR THE PRINCIPAL
FOREIGN TEA-PRODUCING COUNTRIES (EXCEPT FORMOSA)

(In lb. 000 omitted.)

	1913	1914	1915	1916	1917	1918	1919	1920	1921	1922
India ¹ . . .	289,473	300,733	338,470	291,402	359,174	323,660	379,165	285,752	313,878	288,228
Ceylon . . .	192,176	195,216	211,630	202,483	193,033	180,639	208,434	184,846	162,347	171,392
Nyasaland . .	116	166	288	420	155	700	802	497	208	737
S. Africa (Natal). .	113	199	126	49	58	207	332	46	22	239
Total British Empire, lb. .	481,878	496,314	550,514	494,354	552,420	505,206	588,733	471,141	476,435	460,606
Total value in £ (000 omitted) . .	14,765	16,015	18,566	20,388	17,588	17,376	21,526	13,535	19,710	24,370
Java . . .	65,075	71,471	101,815	99,956	80,395	61,138	111,610	95,102	67,773	80,860
Sumatra . . .	—	471	1,327	3,792	3,402	4,907	8,719	11,040	9,251	14,422
China . . .	162,422	175,178	209,536	173,836	124,161	47,184	81,260	40,468	57,007	76,745
Japan . . .	34,030	39,475	45,317	51,124	66,893	51,428	30,935	26,438	15,863	29,148
Total Foreign Countries, lb.	261,527	286,595	357,995	328,708	274,851	164,657	232,524	173,048	149,894	201,175

Years ending 31st March of following year.

IMPERIAL AND WORLD CONSUMPTION OF BRITISH TEAS.—The distribution of the exports of Indian and Ceylon teas is shown on page 147 and page 156 respectively for direct distribution, and page 151 for eventual distribution (Indian teas). The British people, wherever domiciled, are the world's greatest drinkers of tea, and their preference for a fine, full-flavoured tea with stimulating properties causes the bulk of their buying to be of British-grown (principally Indian and Ceylon) teas. China teas are not popular in any part of the Empire, and while it may be too much to say that China tea-drinking in this country is merely a fashionable fad, that expression does approach somewhere near the truth.

It is a remarkable fact, calculated to be of encouragement to tobacco growers, for example, in the British Empire that though British tea-drinking proclivities were nourished on China teas, the taste has gradually changed until Indian and Ceylon teas are now predominant. A great part of the credit for this development is due to the blenders for careful blending in the early days of the Industry, the public having been led on by gentle steps to appreciate a good "body" in its tea.

So far as the British Empire market is concerned, therefore, China hardly counts as a competitor of British-grown teas, or only so far as coffee and cocoa do; the product is something different. In foreign markets, and particularly in countries where the taste for tea has yet to be developed, the case is otherwise. There, China tea must always be ranked as a strong competitor, and it behoves the British tea growers to get "first in" at the formation of national tastes in tea. Good work in this direction is being done by the Indian Tea Cess Committee, whose activities are described on page 150.

Japanese green teas, like Chinese, are not felt as competitors in the British Empire market to any extent, but go principally in Japanese home consumption, which is very large, and in export to the United States.

The case is different when we come to Java and Sumatra teas. These are felt in direct competition with the British-grown article, which they resemble, both in the Imperial and foreign consuming markets. There is a strong infusion of British capital in their production, the pioneer estate in Sumatra having been opened under the auspices of The Rubber Plantations Investment Trust as recently as 1910. In Java the Industry is of older origin. The first attempts were not very successful, probably because the seed and also the method of cultivation and manufacture were brought from China. Neither soil nor climate suited the China seed. Later, fine Assam seed was imported and better methods were adopted, so that at present Java produces tea of excellent quality. At present the Java tea industry is reported to be suffering severely from blight and pests. The *Helopeltis* (mosquito blight) is ravaging many of the lower-lying areas, and each year finds this unwelcome visitor arriving on higher-elevation estates. Nevertheless, with its wonderfully ample and cheap labour supply, Java must always be a formidable competitor.

UNITED KINGDOM CONSUMPTION AND COLONIAL PREFERENCE.—Since June 2nd, 1919, British-grown teas have benefited from a preferential rate of duty

amounting originally to 2d. per lb., and since the 1922 Budget to 1½d. per lb. An interesting result of this preference is that it at once brought about a drop of 2d. per lb. in the price of Dutch Colonial teas to bring them to the same selling level, and this lower price was also reflected in *lower foreign selling prices* for Java teas. Such a result could only be brought about by Great Britain being the principal consuming market in the world, the prices realised for teas in bond in London setting the ruling rate. British-grown tea was, therefore, assured of an extra 2d. (now 1½d. per lb.) over foreign teas in the United Kingdom market—the greatest in the world—plus an extra 2d. (1½d.) in other markets. The latter advantage has naturally been more difficult to translate into hard cash than the former, because naturally enough there has been a tendency abroad to prefer the cheaper Java, etc., tea,¹ other things being equal. British growers are, however, in a strong position, as the United Kingdom consumption of their teas is mounting year by year and a steadily larger proportion of their total output comes to this country. The preference is, therefore, very acceptable to the growers.

The following table shows withdrawals from bond for home consumption :—

	At Full Rate of Duty. lb.	At Preferential Rate.	Total.
1913	305,489,732	(no preference)	305,489,732
1919 ²	147,590,554	240,414,866	388,005,420
1920	52,015,308	340,323,829	392,339,137
1921	38,955,955	371,168,185	413,124,140
1922	49,400,909	361,872,000	411,273,004

Proportion British-grown (in 1922)=88 per cent.

New Zealand takes about 8,500,000 lb. of tea a year, of which nearly 8,000,000 lb. is British-grown, most of the rest coming from Java and a little from Sumatra and China. Bulk tea from the British Empire enters duty-free; non-British-grown tea is taxed 2d. per lb. There is also a duty on packets of tea weighing under 5 lb. net.

Australia imports a large quantity of tea, particularly from Java and Ceylon. Of late years the import of Java tea has grown enormously, owing to the fact that there is no preferential duty in Australia on Empire-grown tea, therefore Australian buyers have naturally bought in the cheapest market, viz. Java.

RECENT HISTORY OF THE BRITISH TEA-GROWING INDUSTRY.—The British tea-growing industry has weathered several very severe crises in its time. The first of these to which reference should be made was in the early years of this century when the great increase in the area planted up in India and Ceylon (and also in Java) during the 'nineties led to severe over-production. In India, especially in the less-favoured districts, large areas of tea were temporarily

¹ At times on a strong tea market, Java teas have recovered a good part of the difference, the effect, allowing for the extra duty, being to make them too dear for consumption in this country and putting them on a level for prices with Indian and Ceylon teas abroad.

² Preference from June 2nd (1919).

abandoned and many small growers came to grief. As there was never any doubt, however, as to the ultimate soundness of the Industry, an era of the formation of large Joint Stock Companies commenced bringing numerous separate estates under one management. Cultivation methods were also much improved and the crisis had the good effect of putting a stop to extensions until the market for tea had developed sufficiently to keep pace with production. In Ceylon, which weathered the crisis more successfully, on the whole because the planting industry was more centralised and better organised, while the average yield of tea to the acre was at that time greater than in India; a check was at the same time given to new planting of tea by the greater interest just then commencing to be taken in rubber planting.

Considering planters as a community, nothing is more striking than their excessive and inveterate optimism which impels them, when they have got the proverbial "good thing," to ruin all by over-planting. Hence, any limiting factor which comes naturally or can be brought into play—such as insufficiency of suitable land or labour, a period of unremunerative prices, lack of capital even—or any diversion occurring at the right moment is of great importance.

As has been pointed out, such a check was imparted to fresh tea planting in India by the unremunerative nature of the Industry during the first few years of the century, and it was not till after 1906 that planting recommenced. In Ceylon, the impetus given to rubber planting by the coming of the motor-car diverted planting enterprise into a new channel to such an extent that the tea acreage of that country has remained stationary ever since. It is no exaggeration to say that the rubber industry saved tea—as a profitable cultivation—by preventing its extension beyond reasonable bounds. One great change brought about by the over-production was the final ousting of China tea from the British markets. On the whole, the end of the crisis left the British tea-growing industry in a very strong and stable position, which lasted with minor setbacks till 1920. The second crisis that the Industry has passed through during less than a quarter of a century then developed. It is one from which the Industry has only just recovered, and happily it has proved of shorter duration than its predecessor. The crisis was brought about principally by the following factors :—

(1) Though no extensions were made in Ceylon during the years 1907 to 1913 and again during the War, considerable planting had been done in India, and also in Java and Sumatra. The increase in the Indian planted acreage between 1907 and 1918 amounted to about 26 per cent, and was, moreover, in the heaviest bearing districts.

(2) In addition to the naturally higher output from the larger cultivated areas, coarse plucking had come to be practised, adding greatly to the production of commoner teas, which became a drug in the market. During the latter period of the War the Government took control of the tea trade, rationed tea and fixed a flat rate for its sale in the United Kingdom: at the same time two-thirds of the 1918 output of tea was bought forward at an average price based on pre-War prices. From an immediate financial point of view this was fairly satisfactory to the growers, both as no limit was put on the amount of

tea to be produced, nor any stipulation made as to its quality; it was a direct encouragement to the above policy of coarse plucking, resulting in the production of low and medium teas in great quantity and so led to the latter catastrophe.

(3) The disappearance of Russia from the market—that country having previously taken about 100,000,000 lb. of plantation teas and 60,000,000 lb. of China teas annually, created a gap in the demand, which, however, was partly compensated by the falling off in Chinese exports by about 100,000,000 lb.

(4) The release occurred of war stocks of tea and of tea held up at ports of shipment owing to insufficiency of shipping facilities during the War. The United States market was also found to be overstocked with Java and Sumatra teas shipped there during the War, as outlet in Great Britain was denied them.

At the beginning of 1919 prices in London for all grades of tea were good, stocks in the United Kingdom were not excessive, but apparently no account was taken of stocks held in the producing countries, and production was continued at maximum capacity, which meant about 150,000,000 lb. above the pre-War level. The situation in producing countries was somewhat relieved by increased consumption in the United Kingdom and by larger shipments to Australia. During 1920 stocks accumulated and the break in the market which came in that year was very severe. The trouble lay principally in the market for common teas. Heavy production, coarse plucking, and poor storage facilities had resulted in an accumulation of inferior teas.

In 1921 planters in India and Ceylon resorted to finer plucking, and production was decreased. This not only reduced total output, but also lowered the proportion of common teas. By the end of the year the situation was much easier. In 1922 restriction of output was continued, stocks were reduced, and the year as a whole was a prosperous one.

The statistical returns of average dividends of Indian and Ceylon tea companies to be found on pp. 144-5 and pp. 154-5 will enable an idea to be obtained of the financial results from tea cultivation in these two important parts of the British Empire, and it will be seen that the record is an exceptionally fine one.

THE LONDON TEA MARKET

The London Tea Market is the most important of the world's three leading tea auction markets—those of London, Calcutta, and Colombo. The quantity disposed of at the public sales in two recent years has been as follows:—

	Calendar Year 1922		Calendar Year 1923	
	Packages.	Average price. s. d.	Packages.	Average price s. d.
Northern Indian Teas	1,541,083	13·46	1,559,724	16·76
Southern Indian „	205,720	12·00	147,057	16·14
Ceylon „	856,146	13·84	745,633	17·38
Java „	157,747	10·13	123,832	12·94
Sumatra „	42,680	11·24	19,754	14·45
Nyasaland, etc. „	6,722	10·77	7,896	14·34

METHOD OF HANDLING IMPORTED TEAS.—When tea reaches London for sale it is stored in one of the following public bonded warehouses, there to be held pending sale and payment of duty.

Monastery.	Chamberlain's.	Oliver's.
Brook's.	Hay's.	Central.
Red Lion.	Cooper's Row.	Orient.
Smith's.	St. Olave's.	Mint.
Colonial.	New Crane.	South Devon.
Port of London Authority—	Nicholson's.	Gun.
Cutler Street.	Butler's.	Brewers.
Commercial Road.	Metropolitan.	London and Continental
Monument.	Buchanan's.	

In the meantime it is weighed by the Customs Authorities, and the importer instructs his broker regarding the sale. It is the broker's duty, when the tea is to be sold by auction in Mincing Lane (the usual method), to see to the preparation of catalogues, indicating the quantity and description of the teas to be sold, the names of the estates, and the names of the warehouses at which the tea can be inspected. The procedure is to number and mark the packages as soon as they arrive at the warehouse with the rotation number of the ship and year of import; they are then weighed gross in the presence of a Custom House Officer and one of the clerks of the warehouse, each entering the weight in his book.

The above operation completed, the packages have a portion of the top opened; on the arrival of the Selling Broker's Inspector a piece of the lead is cut, and they are then laid down in rows, so as to be easily accessible. In the case of inspecting by boring there is a small hole bored in the package and after inspection the hole is plugged and a piece of tin nailed over. A handful of tea is then taken or drawn with a boring iron from each package by one of the warehousemen and placed separately on trays; these trays are then brought to the Selling Broker's Inspector, who sits in a light part of the warehouse and examines separately the handful taken from each chest. By this means he sees any difference which may appear in the leaves either as regards size or colour. He also carefully smells each sample to be sure that there is no taint or damage. If he finds no variation in quality, he passes the break, and there is no occasion to bulk the tea. An average tare can then be taken and tea can be sold without bulking.

Should there be a variation in the appearance of the teas sufficient to necessitate bulking, the Inspector will then, with the permission of his principal, give an order for the bulking of such parcel as may require it. Samplers from the various wholesale tea buying houses then visit the warehouses and obtain small samples of the teas in which they are interested, giving in exchange packets of equal weight and quality. In the case of the finer teas, recourse is had for valuation purposes to the tea taster for an opinion. Less valuable teas are judged on appearance and by the sense of smell. It is allowable for buyers to send in their bids to the selling brokers prior to the auction; this

can be done to secure the advantage of a first bid which may secure the lot if no advance is offered.

The following are the present charges (1st April, 1924) connected with the various operations carried on in the warehouses :—

IMPORTERS' CHARGES ON TEA

	Packages.			
	Not Exceeding 50 lb.	51 lb. to 100 lb.	101 lb. to 150 lb.	Exceed- ing 150 lb.
Per 100 lb. gross weight on the average weight per break.				
Management Rate, including landing, wharfage, housing, separating into breaks, weighing, furnishing landing weights, examining and turning out for damage not exceeding 5 per cent, ordinary mending, Brokers' inspection by boring, placing on show for public sale and attendance whilst on show (if required), sampling, nailing down, placing in delivery pile and delivery by land	s. d. 1 11	s. d. 1 8	s. d. 1 5	d. 3
Management Rate, including inspection other than by boring	2 0	1 9	1 6	4
If not placed on show for public sale	1 10	1 7	1 4	2
Minimum Charge under either Management Rate : 3d. per package.	Per Package.	Per Package.	Per Package.	Per Package.
Taring	0 6	0 9		1 3
Bulking and Taring	0 8	1 0		8
Re-showing (Minimum : 2 packages per break)	0 8			8
Inspection of Damages exceeding 5 per cent of Mark or Invoice : Unpiling, laying down, lidding, papering, coopering, re-casing and re-piling	1 0	1 0	1	0
Rent, per week	0 0 $\frac{1}{4}$	0 0 $\frac{1}{2}$	0	1

The minimum charge on any parcel landed is 1s. 6d.

No commutation of rent unless for a prompt of 13 weeks and then payment of 8 weeks' rent.

The above rates and charges are not subject to discount.

NOTE :—Subject to an increase of 50 per cent on rent and 100 per cent on all other charges at 1st April, 1924 (notified 6th March, 1924)

THE TEA AUCTIONS.—The tea auctions are held at the Commercial Sale Rooms, Mincing Lane, on Mondays and Wednesdays for Indian teas, and on Tuesdays and also on Thursdays if sufficient quantity offers, for Ceylon teas. The brokers, who usually issue catalogues, are those to whose names an asterisk is attached in the list of members of the Tea Brokers' Association of London, given on page 311 of the appendix to this book. Brokerage is 1 per cent for selling and $\frac{1}{2}$ per cent for buying, but buyers need not engage the services of a buying broker unless they wish to do so. Sales are made at so much per lb. and bids advance by $\frac{1}{4}$ d. per lb. Proceedings at the auctions are characterised by businesslike rapidity, and it is only by such procedure that the long cata-

logues, often numbering 70,000 packages in a week, could be disposed of within the time.

CONDITIONS OF SALE FOR INDIAN AND CEYLON TEAS.—The following are the conditions of sale :—

1. The highest bidder shall be the buyer, but the seller shall have the right to withdraw any lot before or during the sale. Any alteration of quantity owing to short landed, missing or damaged packages, when possible to be announced in the sale. Any dispute that may arise shall be settled by the Auctioneer, whose decision shall be final. Samples will be "on view" at the warehouse not later than 10 a.m. on the Wednesday preceding the auction. Any teas not on show to be withdrawn. Buyers shall be deemed to have bought on the basis of the "show package."

2. Buying brokers or agents purchasing at this sale must declare in writing their Principals (to be approved by the Selling Broker) within 24 hours after the purchase, or be held personally responsible as Principals. Any Buying Broker or Agent who purchases for any person under age shall be held personally responsible as Principal.

3. Buyers shall pay to the Selling Brokers a deposit of £1 per package (or such other deposit as is stated in the catalogue) at the time of sale if demanded by the Auctioneer or on the Saturday following the day of sale, provided the weight notes have been delivered to the buyer by 5 p.m. on the previous Thursday. The remainder of the purchase money shall be paid on or before Friday, 15th February, 1924 (the Prompt Day), on delivery of the Warrants. The delivery of the Warrants (or other documents of title to the tea) by the Selling Broker to the buyer on payment of the purchase money shall be deemed to be delivery of the tea to the buyer. Interest at the rate of £5 per cent per annum shall be allowed on amounts paid by way of deposit and on the remainder of the purchase money from the day of payment to the Prompt Day. The tea shall be paid for in Bond by buyers at the Customs landed weight with Customs tare. Draft as usual. Rent to commence from Prompt Day. The Customs landed weight shall include the odd ounces which the packages may weigh in excess of the Customs inscribed weight. The only tea which may be taken from the packages (without returns) before delivering them to the buyers, shall be that drawn for merchants' samples and for necessary inspecting purposes.

4. These teas have been weighed, inspected, bulked in the country of production or, if necessary, in the United Kingdom and tared, and will be reweighed, papered, and leaded down by the evening of the day after the day of the sale. All packages will be nailed down within six days of the day of the sale. All packages will be put in merchantable condition. Delivery will be given on the day after the day of the sale, and up to the delivery of the Weight Note, on notice being given (in writing) to the Selling Broker the day before delivery is required. The buyer to have the option of refusing any packages as to which the above conditions have not been complied with. Three clear working days are to be allowed for delivery of Weight Notes. The buyer to have the option of refusing to accept any lot or lots for which Weight Notes have not been delivered by the evening of the third day, by giving a written notice to that effect to the Selling Broker on the following morning if, on application, he cannot then obtain them. Missing packages, if equal to bulk, and not more than 5 per cent, are exempted from this condition, and are to be taken by the buyer at the original price and prompt if tendered within fourteen working days from the day of the sale.

5. No claim for difference in the bulk from the show package will be entertained unless notified in writing to the Selling Broker within five working days from the day

of sale. No allowance will be made on account of any damage, rubbish, false package, or unequal goodness, found, or alleged to be found, after the tea has been taken from the warehouse.

6. All tea sold at this sale shall be at the risk of the sellers to the extent only of the sale price until the Prompt Day, unless previously paid for. In the event of the whole or any portion of the tea being destroyed or damaged by or as a result of fire prior to the delivery of the Warrants to the buyer, the contract for the whole or such portion shall be cancelled and the deposit paid in respect of it shall be returned.

7. Lot Money to the Selling Broker as usual.

8. If any buyer shall fail to comply with the above conditions, the sellers shall be at liberty to re-sell the teas either by public or private sale, the deficiency, if any, with Interest of Money, from the Prompt Day warehouse rent, and all other charges and damages of every kind, to be chargeable to such defaulter, and to be recoverable against him at law.

9. Any dispute that may arise concerning any parcel sold in this catalogue to be referred to two arbitrators (who must be members of either the Indian Tea Association (London), the Ceylon Association, in London, the Tea Buyers' Association, the Tea Buying Brokers' Association, or of the Tea Brokers' Association of London), one to be chosen by each disputant, and such arbitrators are to appoint an umpire, if necessary. The arbitration fee shall be two guineas to each arbitrator and two guineas to the umpire, if required to act, including attendance at the warehouse, if necessary. The incidence of arbitration fees shall be in the discretion of the arbitrators, or of the umpire making the award.

SALES BY PRIVATE CONTRACT, INCLUDING FORWARD SALES.—The great bulk of the business on the London Tea Market is done at the Auctions, but an occasional sale by private contract is effected—often in the way of a forward sale of an estate's production for the coming year. A growing tendency to arrange forward sales is indeed to be noted and has been deplored by the Committee of the Indian Tea Association (London), which body, however, has been unable so far to secure sufficient unanimity among its members to enable it to make a recommendation. The same question of policy has arisen in the Rubber Industry and it is not proposed to discuss it here. As the I.T.A. General Committee observe: "Any arrangement for refraining from selling whole or part crops, to be effective, would require the support of practically the whole of the members, and the co-operation of other producing countries would also be desirable." The forward selling of the produce of a particular estate is, of course, quite a different matter from a purchase or sale of "Futures" to be covered as opportunity occurs. There is, in fact, no dealing in Future positions on the London Tea Market. This is due to the absence of standard grades.

THE TEA CLEARING HOUSE.—No account of the organisation of the London Tea Market would be complete without a reference to the Tea Clearing House, at 16 Philpot Lane. Established in 1888, the Tea Clearing House serves as an intermediary between the wharfingers (Bonded Warehouses) and the trade. Its main function is to afford facilities to the wholesale trade in tea for the lodgment and transmission of warrants, sampling, delivery, carding, cording,

and other orders to the various docks and warehouses; and, further, to provide facilities for the return of warrants and other documents to the trade. In addition to the centralisation of the above operations, the Clearing House undertakes the payment of minor charges to the warehouses, issuing for this purpose a series of nine denominations of stamps, and performs a number of other services. The Institution is the general headquarters for the preparation of statistical statements and for the provision of information relating to the storage, working, and delivery of tea, supplying lists of approximate "due dates" of ships, reporting and breaking bulk dates, etc. Activity is greatest about the hour of ten in the morning (lodgment of warrants) and just before 4 p.m. (delivery of documents).

CHAPTER II

GEOGRAPHICAL SURVEY: TEA

1. THE TEA INDUSTRY OF INDIA

[Revised to January 1924; statistics to March 31st, 1923.]

Tea Acreage in India. Production of Indian Teas. Green Tea. The Capital Investment Represented by Tea in India. Profit-Earning Record of Indian Tea Companies. Labour and Wage Costs. Calcutta Tea Auctions. Shipments and Marketing of Indian Teas. Rates of Freight. Exports of Tea Waste. Indian Home Consumption and Import Trade. Propaganda for Indian Tea. Export Duty. Distribution of Indian Tea.

TEA ACREAGE IN INDIA.--The following table shows the acreage under tea in India at five-year intervals since the beginning of the century. It will be observed that a considerable increase in cultivation took place during the War; the tendency during the past ten years has been in the direction of a small annual addition to the acreage under tea in Southern India, while about equivalent acreages have gone out of cultivation in Assam:—

Year.	Assam. Acres.	Bengal. Acres.	N.W. Provinces and Punjab. Acres.	Madras, Travancore, Cochin, etc. Acres.	Total Acres.
1900 . . .	337,327	134,572	17,800	32,788	522,487
1905 . . .	339,206	136,153	17,346	35,299	528,004
1910 . . .	350,244	145,868	17,281	50,161	563,554
1915 . . .	382,824	163,466	17,821	70,829	634,940
1920 . . .	420,155	172,263	18,491	91,450	702,359
1921 . . .	417,200	176,782	18,268	96,290	708,540
1922 . . .	412,499	180,378	17,893	96,963	707,733

In 1921 the area of tea abandoned in Assam was 11,191 acres, while extensions were 8836 acres, resulting in a loss of 2355 acres. The total area abandoned in 1921 throughout India was 16,300 acres, while extensions (including replanting in areas abandoned in previous years) amounted to 23,100 acres. Thus the net increase in the year was 6800 acres. In 1922 the area abandoned in Assam was 9462 acres, and the extensions 4761 acres, equivalent to a decrease of 4701 acres; for all India the total abandoned was 16,072 acres, extensions amounting to 14,820 acres.

The total number of tea plantations in India is 4264, but they vary greatly in size. The average for Assam, Bengal, and Travancore is about the same, viz. 464, 488, and 461 acres respectively; but in Madras, the United Provinces and Bihar and Orissa the average is much smaller, being about 218, 138 and 103 acres respectively. In the Punjab, where tea cultivation is conducted on a small scale, the average area is about 4 acres. These figures relate only to tea-bearing areas and do not include the areas in the occupation of planters but not under tea cultivation.

PRODUCTION OF INDIAN TEAS.—The production of Indian teas in thousands of pounds at five-year intervals and annually during recent years has been as follows :—

INDIAN TEA PRODUCTION

(In 1000 lb.)

Year.	Assam.	Bengal.	N.W. Provinces and Punjab.	Madras, Travancore, Cochin, etc.	Total.
1900 . . .	141,118	46,533	4,432	5,172	197,257
1905 . . .	151,904	53,570	3,907	12,017	221,400
1910 . . .	175,095	64,674	3,464	20,035	263,269
1915 . . .	245,385	89,819	4,875	31,755	371,836
1917 . . .	245,623	91,852	3,649	30,170	371,296
1918 . . .	253,270	89,983	3,947	33,257	380,458
1919 . . .	239,132	99,511	4,267	34,143	377,055
1920 . . .	234,314	71,696	3,539	35,654	345,205
1921 . . .	181,502	58,753	2,548	31,422	274,263
1922 . . .	198,925	71,835	3,291	36,547	310,598

The exports of tea from India have already been quoted above (p. 133) in annual totals and will be found considered in detail, with distribution and local Indian consumption, on pp. 147, 150, etc.

GREEN TEA.—The above statistics of production include both black and green tea. The total quantity of the latter reported to have been manufactured in the year 1921 was 4,397,000 lb., as compared with 5,479,000 lb. in 1920. Of the 1921 production Northern India accounted for 2168 lb., and the out-turn in other districts was: Surma Valley, 1,170,000 lb.; Bengal and Behar and Orissa, 450,000 lb.; and Southern India, 609,000 lb. As will be gathered from comparing these figures with the exports of green tea (*infra* p. 147) the greater part of the production of green tea was retained for local consumption; indeed, the output in India falls short of home requirements, and green tea

is imported from China and Ceylon to make up the deficiency in Northern India, where it is preferred to black tea. The principal leaf grades are Young Hyson, corresponding to Orange Pekoe, Hyson No. 1 to Pekoe, Hyson No. 2 to Pekoe Souchong, Gunpowder, Twankay, Fannings, and Dust.

THE CAPITAL-INVESTMENT REPRESENTED BY TEA IN INDIA.—Most of the important tea gardens in North-East India are managed and financed by Calcutta agency firms, but in Southern India, while agents are not unknown, the majority of estates are privately owned. The total capital of the Joint Stock Companies engaged in the Indian Industry is over £28,000,000, made up as follows :—

Companies incorporated in the United Kingdom	£ 22,710,022
Companies incorporated in India ¹	5,588,591
	28,298,613

It must be pointed out, however, that Indian tea companies have for many years gradually improved their properties and increased their areas by annual requisitions out of revenue without increasing share capital, so that in many instances the actual investment in the properties is greatly in excess of issued capital.

PROFIT EARNING RECORD OF INDIAN TEA COMPANIES.—The Indian tea industry is at present in a highly prosperous condition from a profit-earning point of view, and the results for the completed year 1923 promise to be even better than those recorded in 1922. In this connection the fact mentioned in the concluding sentence of the last paragraph must be borne in mind, as also the circumstance that during periods of depression the capital of many companies was severely written down, thus exaggerating the apparent return on the investment in good years. The profits earned by tea companies have always been of extremely fluctuating character. The following shows the dividend-earning record of 112 Rupee tea companies (i.e. undertakings incorporated and having their properties in India) during the five years, 1918-1922 :—

RESULTS OF 112 RUPEE TEA COMPANIES OPERATING IN INDIA
1918-22 INCLUSIVE

	1918	1919	1920	1921	1922
Average Ordinary Dividend per cent .	19.60	12.57	1.82	7.52	22.13
Number of Companies paying no Dividend in given year . . .	11½	11½	11½	11½	11½
Average Dividend per Dividend Paying Company	23.60	19.02	15.69	19.15	30.23

The companies to which this calculation refers are in no sense selected, but include all companies whose shares are quoted in the Calcutta list and whose trading extended over the five years in question. The dividend record of sixty-eight Sterling tea companies shows better results during the slump, largely

¹ Capitalised in rupees.

because of Excess Profit Duty recoveries; some companies in both classes also benefited through forward sales having been made at favourable prices :—

DIVIDEND RECORD OF INDIAN STERLING TEA COMPANIES

	1914	1915	1916	1917	1918	1919	1920	1921	1922
No. of Companies Contributing to Average	68	68	68	68	66	66	66	66	68
Average Ordinary Dividend per cent	17.05	21.66	19.19	16.5	18.23	14.01	4.20	11.56	23.93
No. of Non-Dividend Payers included in Average	8 ² / ₈	6 ¹ / ₈	8 ⁰ / ₈	6 ¹ / ₈	8 ⁰ / ₈	6 ⁶ / ₈	8 ² / ₈	6 ⁷ / ₈	8 ⁵ / ₈

Grand Average Annual Dividend 9 years, 16.26 per cent.

A comparison worked out on somewhat different lines of the earnings in 1913, 1915 and 1922 of 60 Indian Sterling tea companies may also be quoted. It is taken from the annual table prepared by the Indian Tea Share Exchange (325 Winchester House, London, E.C. 2), and the undertakings to which the particulars refer represent an issued share and debenture capital of £13,519,518 :—

	1913	1915	1922
Profit on total capital, including debentures	13.18 ⁰ / ₀	23.33 ⁰ / ₀	29.14 ⁰ / ₀
Return paid on total capital, including debentures	10.61 ⁰ / ₀	12.10 ⁰ / ₀	16 ² / ₃ ⁰ / ₀
Total reserves	13.24 ⁰ / ₀	24 ⁰ / ₀	34 ¹ / ₂ ⁰ / ₀
Capitalisation per acre, including debentures	£46 10s.	£45	£47

YIELD PER ACRE.—Several circumstances have contributed to bring about general recourse in recent years to a system of "fine plucking," which has, of course, reduced the yield of tea per acre. Huge stocks of common tea had been built up and the production of these common teas was greatly in excess of demand. The labour difficulty (p. 146) was also such as to make it eminently desirable to concentrate the available supply on the production of fine teas.

The yield per acre (general average for all India) has accordingly declined from 586 lb. in 1915 to 571 lb. in 1916, 557 lb. in 1917, 561 lb. in 1918, 545 lb. in 1919, 490 lb. in 1920, and 387 lb. in 1921.¹ (The pre-War average was 503 lb.)

In the case of Assam and Bengal, the two heaviest yielding provinces, the yield has been :—

Assam : (1913) 543 lb., (1914) 554 lb., (1915) 642 lb., (1916) 627 lb., (1917) 615 lb., (1918) 624 lb., (1919) 581 lb., (1920) 558 lb., (1921) 434 lb., (1922) 482 lb.

¹ These averages and those which follow are from "Estimates of the area and yield of the principal crops in India, 1921-22," published by the Commercial Intelligence Dept., Calcutta. Another set of averages, allowing for acreage not plucked during the year, makes the figure for 1921, 430 lb. per acre (instead of 387 lb.), and for 1920, 534 lb. (instead of 490 lb.). The averages for 1922 by this method were: All India, 475 lb.; Madras (Madras), 806 lb.; Lakhimpur, 640 lb.; Travancore, 512 lb.; Cachar, 468 lb.; Sylhet, 443 lb.; Chittagong, 367 lb.; Malabar, 430 lb.; Nilgiris, 393 lb., etc.

Bengal : (1913) 513 lb., (1914) 473 lb., (1915) 555 lb., (1916) 557 lb., (1917) 548 lb., (1918) 532 lb., (1919) 575 lb., (1920) 416 lb., (1921) 332 lb., (1922) not available.

In Southern India (*Travancore*) the average has been : (1915) 495 lb., (1916) 424 lb., (1917) 449 lb., (1918) 509 lb., (1919) 516 lb., (1920) 497 lb., (1921) 407 lb., (1922) not available.

The following is an analysis of the yield per acre, cost of production per lb., and profit per lb. and per acre of sixty Indian tea companies incorporated in the United Kingdom and controlling 273,679 acres of mature tea, with 11,703 acres of young tea (compare table in the previous paragraph which refers to the same sixty companies) :—

	1913 ¹	1915 ¹	1922
Average crop per mature acre	599 lb.	720 lb.	529 lb.
Highest average per acre for any Company	865 lb.	1005 lb.	959 lb.
Average sale price realised	9·07d.	10·65d.	16·73d.
Highest average sale price realised by any Company	13·35d.	12·58d.	22·52d.
Average all-in cost ²	6·46d.	6·90d.	10·20d.
Maximum all-in cost ²	10·23d.	9·70d.	13·72d.
Minimum all-in cost ²	4·46d.	4·83d.	7·98d.
Average profit per lb.	2·61d.	3·75d.	6·53d.
Average profit per mature acre	£6 10 7	£11 4 9	£14 7 9
Maximum profit per mature acre	£11 11 4	£20 3 9	£34 15 11

LABOUR AND WAGE COSTS.—Within recent years the difficulty of obtaining suitable coolie labour has become acute. With more labour much more tea could be plucked, the estates kept in a more efficient state of cultivation and new areas opened out. The last year has seen some improvement in labour conditions, but so long as good food crops are grown in the recruiting districts, the coolie is reluctant to leave his home, therefore free recruiting is not likely until there is a bad failure of the crops. Further, the establishment of manufacturing and mining concerns in the labour districts is bringing competition into the labour market.

These remarks apply most closely to Northern India—the largest tea-producing area. In Southern India, where tea-growing is becoming of increasing importance, labour conditions are much better, and there is no doubt that considerable development in the opening out of new areas is taking place.

The Assam labour situation has recently (October, 1922) been the subject of investigation by a specially appointed Enquiry Committee, which represented majority and minority reports. The writers of the minority report were of the opinion that the remuneration in money payments, together with the various concessions received, was sufficient to maintain the coolies in health and reasonable comfort. The majority report, while agreeing that this was generally the case, made certain reservations, maintaining that under the altered conditions the labourers in recent years had less money to spend on clothing and

¹ The 1913 and 1915 figures refer to 50 companies only.

² All-in costs are found before providing for taxation or for minimum interest on capital investment, and it must be remembered that companies disposing of the whole or a large part of their output in the Calcutta auctions naturally show a lower "all-in" cost since freight, etc., has not to be provided for.

TEA, CACAO AND COFFEE

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petty luxuries, whilst the possibility of saving must have been very limited in most cases. It was recommended that it should be left to District Sub-Committees to investigate the requirements of each district and to make recommendations in respect to wages. At a later stage the Assam Branch of

BRITISH INDIA

EXPORTS OF TEA

	Quantity.		Value.	
	1921	1922	1921	1922
	lb.	lb.	Rs.	Rs.
Tea, black---				
To United Kingdom	295,742,073	268,037,040	15,52,52,455	19,42,51,257
„ Russia	—	—	—	—
„ Turkey, Asiatic (including Mesopotamia)	4,417,640	4,019,674	19,76,740	28,56,228
„ Arabia	2,379,114	398,724	7,87,261	2,79,193
„ Persia	1,421,892	1,959,923	8,54,289	14,75,368
„ Ceylon	4,514,486	2,612,152	29,73,793	15,39,691
„ Hong-Kong	5,178	1,578	2,621	1,203
„ China (exclusive of Hong-Kong and Macao)	6,600	16,907	4,331	16,261
„ Egypt	3,366,642	2,152,342	10,73,852	12,42,999
„ Cape of Good Hope	834,494	1,482,085	4,06,625	9,92,097
„ Canada	11,176,040	10,885,374	46,87,624	68,91,767
„ United States of America . .	8,643,381	4,598,258	36,12,969	26,78,086
„ Australia	8,747,255	3,957,745	33,98,725	22,83,268
„ New Zealand	583,151	628,919	2,30,447	3,39,530
„ Other countries	3,528,122	4,057,624	16,11,589	28,46,687
Total	345,366,068	304,808,345	17,68,73,321	21,76,93,635
Tea, green	357,242	684,824	1,71,350	4,84,049
Total of Tea	345,723,310	305,493,169	17,70,44,671	21,81,77,684
Share of each Province in the Exports of Tea--				
Bengal	314,304,455	273,523,888	15,64,15,011	19,68,19,769
Bombay	2,476,162	2,946,500	17,28,062	23,35,931
Sind	351,557	220,342	1,69,378	1,45,275
Madras	28,584,159	28,792,209	1,87,26,769	1,88,67,459
Burma	6,977	10,230	5,451	9,250
Total	345,723,310	305,493,169	17,70,44,671	21,81,77,684
Tea Waste for manufacture of Caffeine	4,381,006	1,679,977	7,95,746	2,36,103

the Indian Tea Association passed a resolution declaring that no further enquiry or restricted action was called for on the question of wages from the District Committees, thus shelving the question. Generally speaking it is realised that the difficulty in recruiting is due to the increased prosperity of the Indian coolie in his own district, but every effort is being made to open up new recruiting grounds.

The importance of the question will be realised when it is stated that even with the labour shortage as great as it is, there were, in 1922, 516,390 coolies employed in the Assam tea industry to a cultivated area of 412,999 acres (against 530,706 in the previous year). In relation to production this is one coolie to every 385 lb. of tea plucked. The total number of persons employed in the Indian tea industry in 1921 (the latest year for which a complete return is available) was 772,200—a decrease on the previous year of 70,700.

The average monthly wage of labourers employed in tea gardens in Assam showed the following increase at the beginning of 1922 (compared with pre-War):—

Men, 25 per cent; women and children, 20 per cent.

It may be noted that the tea-garden coolie is able to supplement his cash earnings on the garden by private cultivation, and obtains other privileges, such as free fuel and grazing, which add largely to the amount of his money wages.

SHIPMENT AND MARKETING OF INDIAN TEAS.—The unit of sale is uniformly the lb. c.i.f. for London and f.o.b. for America. The unit of shipment is the chest, which varies in weight from approximately 80 to 120 lb. net according to the fineness or coarseness of the quality packed. Fannings and Dust would approach more nearly to the maximum weight, while Souchong, owing to the size and coarseness of its leaf, would turn the scale at nearer the lower weight.

Shipments of tea from India fall into two classes: (a) consignments direct from the garden to London, where they are sold by auction in Mincing Lane—this is a subject dealt with in the section on the London tea market; (b) consignments sold at auction in Calcutta and shipped thence chiefly to what is known as “outside” destinations, i.e. countries other than the United Kingdom. It is with the latter that it is proposed immediately to deal.

The exports by sea for two recent calendar years, with the direct distribution from India, as shown on page 147.

In a normal trade year the principal months for tea shipments are from July to December inclusive; but appreciable quantities also go forward in June, January, and February.

CALCUTTA TEA AUCTIONS.—The auctions are held at Calcutta weekly during the tea season. The quantity disposed of in 1913-14 and in recent seasons was:

	1913-14	1920-21	1921-22	1922-23
	Packages.	lb.	lb.	lb.
Quantity . . .	847,079	53,400,600	51,097,900	68,980,400
Average value . .	7 as 9 p.	5 as 1 p.	10 as 1 p.	13 as 3 p.

Bids advance at not less than 1 pie per lb. on tea under 8 annas and not less than $\frac{1}{4}$ anna on tea at and above 8 annas. The tea cess (p. 150) is charged by brokers to sellers' accounts and deducted from the buyers' bills.

All transactions are under the rules and regulations of the Calcutta Tea Traders' Association (c/o Secretary, Bengal Chamber of Commerce, Calcutta), an important body representative of buyers, sellers, and brokers. The brokers are bound under a forfeit of Rs.5000 to abide by the rules of the Association and have also to provide two sureties for Rs.2500. Brokers are not permitted to be directly or indirectly interested in any purchases or shipments of tea, and merchants and agents are bound not to be interested as brokers in any purchases, sales or shipments.

Teas are sold for cash ten days after purchase, and the firms draw for their value through a bank against shipping documents. Some gardens sell the whole of their production in advance.

For the South American market, which prefers a blend of Ceylon and Indian teas, arrangements were come to in 1917 permitting blending in bond in Calcutta under Customs' supervision.

RATES OF FREIGHT.—In the pre-War year the rate of freight on tea from Calcutta to London stood at £1 15s. 0d. per ton of 50 cubic feet. It rose in 1917 and 1918 to £15 per ton, falling thereafter to stand at £2 7s. 6d. per ton (subject to 10 per cent rebate) in 1922. It is now (Feb., 1924) 42s. 6d. net. (From Malabar Coast: 52s. 6d. to London, Marseilles, Antwerp, Hamburg, Rotterdam, Amsterdam or Bremen. 62s. 6d. Havre and Dunkirk. 67s. 6d. Manchester.)

EXPORTS OF TEA WASTE.—Tea waste or refuse is the chief source commercially of caffeine. A considerable quantity of tea refuse is exported from India, the bulk going to the United States of America. The drop in the exports in 1922 (*supra* p. 147) is significant, and points to an abuse which has recently grown up. The question of the sale of tea waste and tea fluff in India has, in fact, been under consideration by the Indian Tea Association of Calcutta, and the Indian Tea Cess Committee, and a circular was issued to members in Calcutta drawing attention to the injury which is done to the Tea Industry by tea waste, which is unfit for human consumption, being sold to dealers in India for any other purpose than to be used in the manufacture of caffeine. It is felt that the sale of tea waste for human consumption should be prevented, and agents and garden managers are being requested to make certain that sales of tea waste and fluff are only effected to dealers who produced clear evidence that the stuff is meant for shipment ex-India for chemical purposes, or, as an alternative, to arrange that the tea waste be sold only by the agents in Calcutta and not disposed of locally by the garden managers.

INDIAN HOME CONSUMPTION AND IMPORT TRADE.—The figures given for net exports (*supra* p. 147) naturally ignore the existence of a considerable local consumption of tea in India, and also omit notice of imports by land and sea. No absolutely reliable figures for home consumption of tea in India are obtainable, but it is possible to calculate in the following way the *quantity available* for home consumption—admittedly not quite the same thing:—

QUANTITY OF TEA, GREEN AND BLACK, AVAILABLE FOR CONSUMPTION IN INDIA,
DURING THE YEARS 1917-18 to 1921-22

	Production.	Deduct net exports to foreign countries.	Add stocks from previous year.	Deduct stocks left at end of year.	Balance available for consumption.
1917-18	371,296,338	346,674,172	61,000,000 ¹	43,500,000 ²	42,122,166
1918-19	380,458,975	312,012,408	43,500,000 ¹	61,500,000	50,446,567
1919-20	377,055,639	370,372,501	61,500,000	38,376,000	29,897,138
1920-21	345,339,576	276,510,111	38,376,000	63,247,000	43,958,465
1921-22	274,263,771	304,829,523	63,247,000	2,112,500	30,568,748
1922-23	310,598,442	281,494,433	2,112,500	2,900,000	28,316,509

NOTE.—(1) Columns 4 and 5 have been obtained through the courtesy and assistance of the Indian Tea Cess Commissioner. (2) The stocks at the end of 1917-18 and 1918-19 were abnormally high owing to lack of freight.

Apart from the above, Burma absorbs annually about 18,000,000 lb. of pickled tea (*letpet*), which is grown chiefly beyond her borders in the Northern Shan States. Excluding *letpet* the import trade in tea has amounted in recent years to 5,434,000 lb. (1920-21), 6,582,000 lb. (1921-22), and 6,109,000 lb. (1922-23). The greater part of the imported tea (about four-fifths) is green tea from China for local consumption in India (*supra* p. 144), but some is tea from Ceylon (*infra* p. 155) imported for blending purposes, and the rest is tea shipped from various countries to Bombay, which is the distributing centre for Persian Gulf ports, for re-export.

PROPAGANDA FOR INDIAN TEA.—An excellent work of propaganda in favour of Indian tea has been carried on since 1903 by a body known as the Indian Tea Cess Committee. The Committee derives its revenue from an export duty on cess which was imposed by Act IX of 1903 for a period of five years, and came into operation on the 1st April, 1903. In 1908, when the five years' period came to an end, it was agreed that the case should continue for a further five years. Similar action was taken in 1913, in 1918, and again during the present year. The current period will expire on the 31st March, 1928.

The cess was levied at the rate of $\frac{1}{2}$ pie per pound of tea exported from 1903 until 1921. Early in that year the Legislative Assembly passed, at the instance of the Cess Committee, an Act so amending the Act of 1903 as to enable the cess to be levied at a maximum rate of 8 annas per 100 lb. of tea exported, or roughly 1 pie per lb. This amending Act became law with effect from the 1st May, 1921. But the maximum rate was not then levied, for it was considered that a rate of 4 annas per 100 lb. (roughly $\frac{1}{2}$ pie per lb.) would be sufficient. And from the 1st May, 1921, until 20th April, 1923, the cess was collected at this rate. But to enable the Cess Committee to undertake an advertising campaign in the United States of America they recommended the Government of India to enhance the rate to 6 annas per 100 lb. This recommendation the Government of India adopted, and with effect from the 21st April, 1923, the cess has been levied at 6 annas per 100 lb. of tea exported.

¹ Estimated stocks at Calcutta (Kidderpore), Chittagong, Madras and Bombay, and also the amount held up at the gardens.

² Estimated stocks at Calcutta (Kidderpore) and Chittagong (Bombay) and Madras, being normal, and also the amount held up at the gardens.

The tea industry of both Northern and Southern India supported the Cess Committee in recommending this increase. In the year ended the 31st March, 1923, the yield of the cess amounted to £48,537. The appropriation for 1923-24 include a sum of Rs.4½ lakhs for advertising Indian tea in India, £20,000 for advertising in France and Belgium, £20,000 for the same purpose in the U.S.A., and an allocation for the British Empire Exhibition, 1924.

EXPORT DUTY.—In addition to the duty levied under the Indian Tea Cess Act (p. 150) an export duty of Rs.1-8 per 100 lb. (equivalent to about 3 pies per lb.) has been in effect since 1st March, 1916. The amount collected during 1921-22 was Rs. 42,26,000.

DISTRIBUTION OF INDIAN TEA.—The following table shows the final distribution of Indian tea exports and brings this section to an appropriate conclusion. Unfortunately it has proved impossible to bring the statistics down to as late a date as those given on page 147, which it may be again mentioned give the destinations of the direct exports from India only, and do not include the redistribution which takes place from London, etc.

INDIAN TEA TAKEN OUTSIDE THE UNITED KINGDOM

	1919 lb.	1920 lb.	1921 lb.
Australia	7,782,826	6,521,278	8,201,313
U.S.A.	8,056,037	10,110,129	11,861,515
Canada and Newfoundland	11,095,297	19,958,174	21,705,258
South America . . .	3,848,783	3,588,956	1,407,804
Persia and Arabia . .	4,216,038	4,806,715	3,090,540
Russia	1,077,097	245,083	47,435
Egypt	1,223,572	1,873,647	3,113,430
Turkey : European . .	533,936	260,387	205,542
„ Asiatic	4,697,399	5,534,526	2,583,089
Straits Settlements . .	232,637	202,062	279,869
Holland	6,493,240	1,718,122	2,302,635
Belgium	654,667	240,508	81,562
Denmark	1,111,488	397,453	263,911
Germany	159,712	1,188,914	1,591,046
France	935,843	219,804	181,634
Norway and Sweden . .	360,524	194,428	225,885
Italy	74,433	58,993	25,948
Austria-Hungary . . .	108,508	6,149	1,256
Gibraltar, Malta, and Gozo .	76,073	161,075	125,807
British West Indies . .	345,922	108,653	112,105
Channel Islands . . .	382,582	1,089,113	1,087,290
Roumania	269,746	118,357	38,543
Greece	146,402	80,745	330,611
South Africa	1,285,947	1,463,876	2,082,361
China and Hong-Kong . .	161,856	29,610	15,323
Kenya Colony	367,989	293,120	292,532
Zanzibar and Pemba . .	146,425	39,043	92,157
Ceylon	2,973,923	5,575,947	8,285,830
Other Places	1,547,905	1,466,634	1,833,152
Total	60,366,807	68,053,401	71,464,373

CHAPTER III

GEOGRAPHICAL SURVEY: TEA (*continued*)2—6. THE TEA INDUSTRY OF CEYLON, WITH NOTES ON TEA IN
BRITISH MALAYA, NATAL, AND NYASALAND

[Revised to January, 1924.]

Ceylon Tea Industry. Yield per Acre. Improved Technical Efficiency. Cost of Production. Profit Earning Record of Ceylon Teas and Combined Tea and Rubber Planting Companies. Exports and Distribution of Ceylon Tea. Colombo Tea Sales. Export Duty. Freight Rates. Tea in British Malaya. The Tea Industry in Natal. Tea in Nyasaland. Tea in Uganda and Kenya.

2. CEYLON TEA INDUSTRY

TEA cultivation was only taken up in Ceylon after the failure of the Coffee planting industry in that country, as a result of the attacks of the leaf disease (*Hemileia vastatrix*). This was in the middle 'seventies. The coffee plantations, covering 275,000 acres, were rapidly replanted with tea, and by 1895 there were 305,000 acres under this cultivation. The present area in tea (census figures) is about 418,000 acres, mostly in bearing—another authority 405,000 acres. There are altogether about 1250 estates, and these for the most part are situated at elevations above 3000 feet, nearly 80 per cent of the total tea acreage being in the Kandy, Nuwara Eliya, and Badulla Districts. Whole stretches of the country at the higher elevations are covered with tea, but it can also be, and is, grown at the lower elevations down almost to sea-level. The possibilities of extending the cultivation of tea are limited by the fact that little land in the older planting districts of Ceylon is available for further opening in tea. Land is, however, available in the districts of Uva, Sabaragamuwa, Kurunegala, and Kegalla, and in other parts of the lower hill-country.

YIELD PER ACRE.—At one time the average yield per acre in Ceylon was much higher than in India, but this is no longer the case. Under present harvesting arrangements, which entail "fine" plucking, actual yield is, of course, not the highest that can be got. An average based on dividing the 1922 exports by the number of acres under cultivation shows a flat output for the Colony of 411 lb. per acre in that year, but this is assuming that the whole acreage is in bearing—which, if nearly, cannot be quite, correct. Again, 1922 was not on the whole a favourable flushing season. Making all allowances, however, the figure given cannot be very far out as representing average out-turn per acre under the "fine" plucking regime.

Yields on different estates naturally vary greatly with soil, jât (variety), elevation, cultivation, manuring, etc. There is no cold weather season in

Ceylon, as in North-Eastern India, when the bushes are rested and pruned ; the leaf is plucked throughout the year, and the bushes are pruned at intervals.

The crop seasons for tea vary in different parts of the island. They depend largely upon the weather, the bushes flushing freely when rain follows a dry spell. For this reason, April and May are generally the heaviest months for pluckers. October and November often show heavy flushing, but this is somewhat uncertain.

IMPROVED TECHNICAL EFFICIENCY.—During the past year or two the quality of the teas produced has been exceptionally good. Apart from greater care in plucking the leaf, many improvements have been made in manufacture in the factories. Many estates are continuing to install new machinery in their factories, and there is little doubt that increased profits will result in marked improvements in tea factories during the next year or so. Cultivation is improving upon all estates where labour is adequate, and manuring programmes have been liberal. As a result, tea at the present time is in healthy and vigorous growth, and shows a marked improvement over the years of war, when cultivation and manuring had to be restricted.

COST OF PRODUCTION.—Ceylon costs of production for tea are usually given f.o.b. Colombo. The following average was obtained from returns supplied by thirty-six companies :—

	Pence.
Cost of tea f.o.b. Colombo, 1922 . . .	8·46
" " " " 1921 . . .	7·47
Increase	·99

A remarkably large proportion of the companies whose figures were examined showed costs closely on either side of these figures, and they undoubtedly represent with great accuracy the level to which costs had risen in 1922. An addition of practically one penny per lb. on one year is a considerable item. The way costs may vary between neighbouring estates is well shown by the following comparison of the costs f.o.b. Colombo, of tea from four Ceylon estates, an interesting point being that they all belong to the same company. The extra cost of production incurred by estate (3) was due to a heavy manuring outlay and to heavier expense of plucking owing to low yield per acre. Estate (4), on the other hand, had the cheapest cost through saving on a number of items—manuring, superintendence, weeding, contingencies, etc.

COSTS AT COLOMBO OF TEA FROM FOUR CEYLON ESTATES

	(1) 837 acres. cents.	(2) 301 acres. cents.	(3) 456 acres. cents.	(4) 248 acres. cents.
Costs in cents per lb.	52·81	55·30	65·75	48·19
Equal to pence per lb.	8·45	8·65	10·52	7·71
Net selling price Colombo	105·04	109·30	104·64	96·65
Average yield per acre lb.	438	482	323	437
Average profit per acre	£15 4 2	£16 1 6	£8 1 11	£13 15 10

To give an idea of the minuteness with which every item of expenditure is checked on well-managed Ceylon estates—which happily are in the great majority—it may be mentioned that the above costs are analysed in the original under no less than twenty-seven heads of expenditure. One of the items, “visiting fees,” refers to the charges made by the Visiting Agent, or “V.A.,” as he is called (an old-established Ceylon and Eastern institution), when he makes his periodical round to inspect the estate in the interests of the owners. The profession of visiting agent is a much-respected one in Ceylon; the members usually being planters of great experience. The fact of the existence of such a body of men is of great assistance to prospective buyers of estates or land for planting up and they also act as appraisers. The various operations are all charged at their cost according to the number of coolie-days spent on each class of work. The item “loss on rice” is of frequent appearance as a “cost” and sometimes amounts to a very high proportion of total costs.

PROFIT-EARNING RECORD OF CEYLON TEAS AND COMBINED TEA AND RUBBER-PLANTING COMPANIES.—In Ceylon, as in India, the limited liability company is much to the fore, and the Ceylon tea industry, like the rubber industry, has been largely developed on funds sent from Great Britain for investment in tea-growing. There are also a large number of Rupee companies registered in Colombo. A large proportion of both classes grow rubber as well as tea, and sometimes also cacao or other products. Originally much rubber was planted through old tea, which it was allowed to kill out, but at the present day it is usual to keep the two cultivations distinct, though grown by the same company. The following tables show the average dividends paid during recent years by (1) Ceylon Rupee tea companies, (2) Ceylon Rupee companies with tea and rubber, (3) Ceylon Sterling tea companies, (4) Ceylon Sterling companies with tea and rubber.

* RESULTS BASED ON THE ANALYSIS OF THE RECORDS OF 175 CEYLON TEA AND COMBINED TEA AND RUBBER UNDERTAKINGS

CEYLON RUPEE TEA COMPANIES

	1911	1912	1913	1914	1915	1916	1917	1918	1919	1920	1921	1922
Average Ordinary Dividend per cent	12.93	11.62	10.46	11.75	19.66	11.11	11.09	11.31	11.7	1.59	17.68	22.48
No. of Companies contributing to average . .	24	25	27	28	28	32	33	33	35	38	38	40
Non-Dividend Payers included in average	24	25	27	28	28	32	33	33	35	38	38	40

CEYLON RUPEE COMPANIES WITH TEA AND RUBBER

	1911	1912	1913	1914	1915	1916	1917	1918	1919	1920	1921	1922
Average Ordinary Dividend per cent	15.32	17.11	12.18	13.79	27.82	18.17	15.37	11.46	10.43	1.18	98.06	15.88
No. of Companies contributing to average . .	31	34	37	41	40	43	43	43	44	44	44	43
Non-Dividend Payers included in average	31	34	37	41	40	43	43	43	44	44	44	43

CEYLON STERLING TEA COMPANIES

	1911	1912	1913	1914	1915	1916	1917	1918	1919	1920	1921	1922
Average Ordinary Dividend per cent	—	—	9·63	9·94	13·91	11·76	11·04	10·79	13·68	4·04	17·25	21·26
No. of Companies contributing to average			34	34	35	36	36	36	36	36	36	36
Non-Dividend Payers included in average												58

• CEYLON STERLING COMPANIES WITH TEA AND RUBBER

Average Ordinary Dividend per cent	—	—	12·71	11·52	18·27	17·26	15·08	12·24	15·84	3·10	6·78	12·70
No. of Companies contributing to average	—	—	53	56	56	56	56	56	56	56	56	56
Non-Dividend Payers included in average			53	56	56	56	56	56	56	56	56	56

As this shows, the Ceylon companies with both tea and rubber have not done so well in recent years as tea companies pure and simple, but taking the whole period that comes under review, the former have done a little better than the latter.

The following shows the grand average annual dividend for twelve years ending 1922 :—

Ceylon Rupee Tea Companies	Per cent. 12·78
„ Companies with tea and rubber	14·043

and for ten years ending 1922 :—

Ceylon Sterling Tea Companies	12·33
„ Companies with tea and rubber	12·55

In comparison with Rupee companies, somewhat poorer average dividends were paid by Sterling companies during the years of incidence of the Excess Profits Duty; on the other hand, refunds of E.P.D. may materially have affected dividends in subsequent years.

EXPORTS AND DISTRIBUTION OF CEYLON TEA.—The annual export of Ceylon tea has varied little from year to year except for the decline due to fine plucking in 1921 and 1922. The totals for the past ten years may be seen on reference to the tabular summary on page 133. For 1922 these shipments amounted to 171,807,581 lb., compared with 161,610,966 lb. in the previous year, and 192,176,000 lb. in 1913. The distribution for 1921 and 1922 is given on page 156.

These figures include both black and green teas. Shipments of the latter amounted to approximately 2,150,000 lb., against 2,300,000 lb. in 1921. Out of the 1922 production approximately 1,900,000 lb. were shipped to Canada and the U.S.A., as prices were maintained on too high a level for India, which is normally one of the principal markets for Ceylon green tea. The only other buyers of green tea in any quantity were the United Kingdom (152,568 lb.) and Africa (14,350 lb.).

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Looking at the figures generally, it will be observed that shipments to Australia showed a shortage of over two and a half million lb., as compared

EXPORTS AND DISTRIBUTION OF CEYLON TEA

	1921. lb.	1922. lb.
United Kingdom	110,887,396	117,537,328
<i>British Possessions.</i>		
British India	1,590,404	994,165
Canada	4,408,819	6,762,025
Cape Colony	2,278,375	2,446,319
Egypt	1,788,067	2,579,687
Hong-Kong	151,260	198,548
Mauritius	191,965	382,324
Natal	2,341,862	3,145,645
Newfoundland	333,903	564,592
New South Wales	6,943,631	6,265,604
New Zealand	4,725,983	5,599,804
Other British Possessions in Africa	450,412	609,698
Other British Possessions in Asia	16,456	100,549
Queensland	841,579	494,351
South Australia	1,039,836	793,451
Straits Settlements	774,815	937,359
Victoria	5,215,823	3,971,054
Western Australia	730,434	585,937
Zanzibar	50,253	127,325
Other British Possessions	196,800	176,207
	34,070,686	36,794,644
<i>Foreign Countries.</i>		
France	515,160	1,163,966
Germany	68,447	177,400
Holland	96,017	138,374
Japan	234,964	263,660
Mozambique	83,508	104,684
South America (excluding Chile)	357,463	713,077
Turkey in Asia	61,250	134,457
United States of America	14,611,334	13,956,816
Other Foreign Countries	624,741	823,130
	16,652,884	17,475,609
Total	161,610,966	171,807,581

[1923 exports 183,501,928 lb., including 121,010,033 lb. to United Kingdom, 1,838,717 lb. to India, 8,768,645 lb. to Canada, 14,956,508 lb. to U.S.A., etc.]

with the previous year, and it is worthy of note that this deficiency was made up by exports to the Commonwealth from Java and Sumatra. On the other hand, New Zealand imported about three-quarters of a million pounds of Ceylon

tea in excess of her imports in 1921, and Canadian imports showed an increase of over two and a half million pounds. Other noteworthy increases occurred in the case of Egypt, South Africa, and France.

The establishment of a Tea Cess in Ceylon, the funds from which (as in India) could be utilised in pushing the sale of tea in new markets through advertising, has recently been discussed, but the decision of the majority of the planters is against it. The Industry at the present moment is so prosperous that the need of exploiting new markets is not felt, but the wisdom of this policy is more than doubtful. It is in times of prosperity that any business should be developed and consolidated.

COLOMBO TEA SALES.—Ceylon tea is either shipped to London for sale (usually at the London auctions), sold privately in Colombo, or offered for sale at the Colombo Tea Auctions held weekly on Tuesdays. The following shows the quantity offered annually in these auctions during the past few years, together with the average price per lb. realised for the whole year :—

	Offered. lb.	Sold. lb.	Average. Rupee cent per lb.
1919 . . .	84,773,002	65,589,713	55.86
1920 . . .	88,835,348	57,752,089	43.72
1921 . . .	74,415,088	58,109,894	70.00
1922 . . .	74,907,582	62,767,390	85.00
1923 . . .	83,074,076	64,541,240	102.75

Roughly, therefore, something over 36 per cent of the 1922 exports was sold by auction in the island—a somewhat higher proportion than shipments to foreign and colonial destinations bear to shipments to all countries (see above, p. 136).

The rules provide that no teas shall be catalogued for sale except through members of the Colombo Tea Traders' Association as principals, or unless they are guaranteed by the selling brokers as first hand teas on garden account, or unless they are first bulked and repacked in the store of a member of the Association and remain there pending delivery. Prices realised for individual lots at the sales are not allowed to be published. The Association (headquarters at the office of the Ceylon Chamber of Commerce, Colombo, whose chairman is ex-officio chairman of the Association, and whose secretary is ex-officio secretary) consists of buyers and sellers, the brokers having a separate organisation of their own (Colombo Brokers' Association).

The conditions of sale at the auctions are as follows :—

CONDITIONS OF SALE AT THE COLOMBO TEA AUCTIONS

1. The highest bidder shall be the purchaser, and any dispute that may arise shall be settled by the selling Broker, who shall not declare the name of the Buyer until after the lot is knocked down, unless, in his opinion, there shall be any uncertainty as to the actual bidder. The Seller of the tea or any agent employed by him shall have the right to bid.

2. All teas shall be sold by the lot at so much per lb., free of any export duty, which duty, if any, shall be payable by the Seller. No less advance than 1 cent per lb. to be

made on any previous bid. When a bid is registered by the selling Broker the Bidder shall have the right to claim the tea at any advance in price, such bids to be binding until 1 p.m. of the day following sale.

3. A deposit of 10 per cent shall be made if required at the moment a lot is knocked down, failing which it shall be immediately put up for re-sale.

4. All teas shall be paid for on catalogued weights (less 4 lb. sample allowance on large breaks, and 3 lb. on small breaks) on or before Prompt Day, which shall be five days from date of sale, Sundays and Bank Holidays excepted. On receipt of payment the Seller shall issue a delivery order in favour of the Buyer who shall thereupon take delivery at Seller's stores. Should payment not be made before noon on Prompt Day the Seller shall have the right, on giving notice in writing to the Buyer, to resell the lot or lots at the risk of the Buyer, who shall be liable for any loss resulting from such resale. Buyers of tea shall take delivery of their purchases within twelve working days, after Prompt Day. The tea, notwithstanding the fact that it may have already been paid for, shall be at Seller's risk (to the amount of the contract value only) for two working days after Prompt Day, unless previously delivered, and thereafter (except in the case of any dispute or disagreement arising, in which event it shall remain at Seller's risk pending settlement of such dispute or disagreement) it may remain in Seller's stores at Buyer's risk (except in the case of loss or damage to tea by fire which shall be at Seller's risk) for a further ten working days without any liability on the part of the Buyer for storage. If the Buyer shall not have taken delivery of tea purchased by him within the period of twelve working days after Prompt Day the tea, so long as it remains in Seller's stores shall be at Buyer's risk absolutely (except only in respect of loss or damage to tea arising from the Seller's own negligence or wilful act) and he shall in addition pay the Seller storage charges calculated at six cents per day per full chest and four cents per day per half chest until he shall take delivery thereof. Provided that any payment by the Buyer to the Seller on account of storage charges as aforesaid shall not make the Seller liable in any way whatsoever for any loss or damage to tea from whatever cause arising other than the Seller's own negligence or wilful act.

5. If required by the purchaser two separate delivery orders shall be granted for any parcel of tea consisting of or over 20 chests or 35 half-chests.

6. The selling Broker shall open, inspect and sample the tea. The sample in the case of a large break shall consist of 4 lb. and a small break 3 lb. Four packages of a large break and three packages of a small break shall be sampled, 1 lb. exactly being drawn from each package. Where there are only two packages, 1½ lb. shall be drawn from each package. All packages sampled shall be marked accordingly by prominently stencilling the letter "S" thereon. Provided the samples so drawn are found to be similar, and of equal quality, such sampling as aforesaid shall be considered sufficient, but should there be any variation in quality every package shall be sampled, an equal quantity of tea being drawn from each package. No sampling whatsoever shall be done unless the entire lot shall have arrived at Seller's stores. Catalogues shall state whether or not teas are bulked and hooped, and in the case of teas not bulked every package shall be sampled, an equal quantity being drawn from each package.

7. All teas offered for sale shall be packed in good merchantable packages and the selling Broker shall declare in his catalogue whether such packages are "momi," "native wood," "patent," or "metal." All teas in packages over 28 lb. gross packed with lead under 4 oz. shall be so declared.

8. (a) All packages shall have the gross and net weights marked thereon previous to being offered for sale, and in the event of a shortage in weight being proved to the satisfaction of the Seller he shall be liable for such shortage, and also for the cost of weighing, which shall not exceed $12\frac{1}{2}$ cents per package.

(b) All objections as to quality, description, packing, or weights, must be made on or before the tenth day after date of sale, Sundays and Bank Holidays excepted.

9. Brokers buying or selling tea shall declare in writing their Principals immediately after the sale, otherwise they themselves shall be held responsible as Principals.

10. Should any dispute or disagreement arise between Buyer and Seller, the same shall be referred to the arbitration of one arbitrator to be appointed by both parties, or, if the parties cannot agree as to an arbitrator, to the arbitration of two arbitrators, one to be appointed by each party. The arbitrators shall, before proceeding with the business of the arbitration, appoint an umpire, to the arbitration of whom shall be referred all questions on which the arbitrators are unable to agree. The award of such arbitrator, arbitrators, or umpire (as the case may be) shall be final, conclusive and binding on all parties. If either party shall refuse or neglect to appoint an arbitrator within three days after the other party shall have appointed an arbitrator on his part, and shall have served or posted, under registered cover, written notice requiring him to make such appointment, then the arbitrator appointed as aforesaid shall, at the request of the party appointing him, proceed to arbitrate on the matter in dispute as if he were an arbitrator appointed by both parties for that purpose.

11. Additions or alterations to the foregoing By-laws and/or Conditions of Sale may be made from time to time as occasion arises at a General Meeting of the Ceylon Chamber of Commerce to be called for such purpose in accordance with the rules of the Corporation.

GREEN TEA CONTRACT.—The following is the form of contract on which green tea is bought and sold :—

FORM OF GREEN TEA CONTRACT FOR FINISHED ARTICLE

Contract No. _____

Colombo _____

To Messrs. _____

We have this day _____ purchased _____ from _____
sold _____ by your order and for your account _____
to _____

Messrs. _____ lb. _____

at Cts. _____ per lb.

Tenders to be made as follows, viz. _____

Quality and appearance to be as per standard in our hands, which has been sealed and is marked _____

This contract to be governed by Public Sale Conditions in respect of payment, weighing and delivery, and Prompt Day shall be five days from date of each tender (Sundays and Bank Holidays excepted).

In the event of the Seller's Green Tea Factory and/or its contents being destroyed or so damaged by fire or the Act of God as to render in the Seller's opinion, the fulfilment of this contract by the Seller impracticable, the Seller shall have the right (to

be exercised by notice in writing to be given to the Buyer within ten days of the said factory, etc., having been so destroyed or damaged) of cancelling the contract in whole or in part as from date of such notice.

Should any dispute or difference arise between Buyer and Seller regarding liquor, appearance, packing, weights, quantity, quality, delivery or payment or regarding the rights or claims to compensation or damages of the Buyer and/or Seller on any breach or non-performance of this contract or any question, matter or thing directly or indirectly touching or arising from the subject-matter of this contract or the interpretation of its terms, the same shall be referred to the arbitration of one arbitrator to be appointed by both parties to this contract (*viz.* the Buyer and Seller) or if the parties cannot agree as to an arbitrator, to the arbitration of two arbitrators, one to be appointed by each party. The arbitrators so appointed shall, before proceeding with the business of the arbitration, appoint an umpire, and all questions and matters on which the arbitrators cannot agree shall be referred to the final arbitration of such umpire. The award of such arbitrator, arbitrators, or umpire, as the case may be, shall be final, conclusive and binding on the parties. If either party shall refuse or shall neglect to appoint an arbitrator within three days after the other party shall have duly appointed an arbitrator, and shall have served on him or posted to him, under registered cover, written notice requiring him to appoint an arbitrator, then the arbitrator, appointed as aforesaid shall, at the request of the party appointing him, proceed to arbitrate on the matter in dispute in the same manner as if he were an arbitrator appointed by both parties for that purpose.

BROKERS.

There is also a special form of forward tea contract for estates, and with reference to the arbitration it may be noted that the Ceylon Chamber of Commerce nominates annually a certain number of experts in separate panels for tea and other products, from whose ranks the arbitrators must be chosen if the award is to obtain official certification by the Chamber.

EXPORT DUTY.—From the 25th August, 1922, tea has been subject to an increased export duty, which now amounts to 3 (rupee) cents per lb. This, in the present state of prosperity of the trade, is not an excessive impost. Stocks held for shipments by merchants up to the date of operation of the duty were exempted from the higher scale (provided registration was duly effected with the Customs).

FREIGHT RATES.—At the beginning of 1922 the Homeward Conference rates of freight on tea stood at 60s.; they were reduced to 50s. in February and to 47s. 6d. on the 1st July, 1922. Since then, however, there has been an increase (effective 6th February, 1923) to 52s. 6d., which rate is still valid. The rate to Fremantle, Adelaide, Melbourne, and Sydney is 55s. To New York, Boston, and Philadelphia 30s.

3. TEA IN BRITISH MALAYA

There is little doubt that tea can be grown successfully in Malaya, and its cultivation has recently been the subject of some interest. An estate in Pahang of about six hundred acres is being opened up and this will be the first enterprise of its kind of any size in Malaya, so far as is known.

4. THE TEA INDUSTRY IN NATAL

Tea production in Natal is unfortunately a declining industry, the output and acreage under the product having been in constant reduction for several years past. The exports are at present negligible and have never been large. Production is absorbed for home consumption within the Union of South Africa, where it is protected by a duty of 4d. per lb. on imported tea.

The decline is due to the restrictions on Indian coolie immigration into Natal imposed by the Government of India in 1911, to the superior attractions of sugar cultivation in the same district, and to the consequent high cost of labour. The low price of tea during the slump years has also had its effect.

The Industry in Natal dates back to the early 'eighties and the maximum production was reached in 1903—2,681,000 lb. In the pre-War year 1913-14 the area cultivated under tea was 4484 acres and the production 1,712,865 lb. (exports 113,607 lb.). In the same year the consumption of tea in South Africa was 7,709,979 lb. The 1921-22 statistics show: production, 572,801 lb. (against South African consumption of tea, 8,250,294 lb.) and exports, 26,794 lb.

The capital involved in the Natal Industry is approximately £350,000, and there are six companies engaged in the cultivation.

5. TEA IN NYASALAND

Tea was first introduced into Nyasaland in the early 'nineties by the Church of Scotland Mission, but not till many years after the importation of the seed was any serious effort made to plant areas as a business concern. About the year 1902 the first real start was made. Steady progress has been made by a few enterprising planters, and if the high expectations entertained by them have not yet materialised, the hopes which are still held that the Nyasaland product will come into its own are in some degree supported by the better average prices now obtainable for this tea at the London auctions:—

AVERAGE PRICE OBTAINED FOR NYASALAND TEAS AT LONDON TEA AUCTIONS

	1921.		1922.		1923.	
	s.	d.	s.	d.	s.	d.
Nyasaland Teas . . .	0	6.22	0	10.77	1	4.34
Compare Ceylon Teas . .	1	3.85	1	3.84	1	7.38
Compare N. Indian Teas .	1	0.33	1	3.46	1	6.76

It still seems an undecided question as to the real jât (variety) of the tea; but the variety is generally described as a mixed one, leaning more strongly to the China jât than to any other. Be this as it may, it grows well in Nyasaland, and with ordinary care and normal seasons, the seed is easily raised, and when the plants are strong enough—say eighteen months from the time the seed was put into the nursery—planting out into the field can be done very successfully at the arrival of the proper planting season, usually the month of December to the month of April.

The tea-growing district in Nyasaland is on the south-eastern slopes of the

Mlanje mountains, where the rainfall is very high. The area reported under tea cultivation was 2870 acres in the pre-War year 1913-14, from which it gradually rose to 4840 acres in 1919-20, falling again to 4285 acres in 1920-21. A considerable amount is consumed locally and the exports have risen from 116,074 lb. (value £2902) in 1913-14 to 736,165 lb. in 1922-23.

6. TEA IN UGANDA AND KENYA

There is a little experimental tea cultivation in Uganda and Kenya Colony, but it is not yet an established industry. In Uganda seedlings obtained from Assam seed were planted out on the Government plantation, Kampala, in November, 1910, and have made good progress. The crop is being watched with keen interest by planters, one of whom has already 50 acres under tea. The product is well reported upon, and this crop promises to be suited to the country.

The highlands of Kenya offer conditions of rainfall and soil which in many respects resemble the tea districts of Ceylon. Some very small areas have been planted and the quality of the tea appears to be satisfactory. The great difficulty with this crop would be to maintain a supply of trained and fairly intelligent labour for which the African natives are not so well adapted as the Indian.

CHAPTER IV

THE CACAO-GROWING INDUSTRY OF THE EMPIRE

GENERAL SURVEY INCLUDING CONSOLIDATED TABLES OF CACAO SUPPLY FROM PRODUCING COUNTRIES OF THE EMPIRE AND THE WORLD AND CONSUMPTION OR NET IMPORTS OF CACAO-CONSUMING COUNTRIES

[Revised to January, 1924 ; annual statistics complete to December 31st, 1922.]

World's Production of Cacao. Cacao Cultivation and Preparation. Consumption of Cacao in the British Empire. Cacao Butter. World's Consumption of Cacao. The Marketing of Cacao in the United Kingdom.

DURING the past decade a very remarkable increase has taken place in the world's production and consumption of cacao. So far as production is concerned the credit for the whole of this development belongs to the British Empire, which has increased its output threefold, the production of the rest of the world remaining almost, if not quite, stationary.

The advance in consumption has been greatest in the United States, but

large increases are also to be recorded in the consumption within the British Empire, and in Germany, France, Holland, and elsewhere.

From the following table it will be clear which countries have contributed most to the increase in output. The most striking feature is, of course, the enormous growth in the exports of native-grown cacao from the Gold Coast and Nigeria. A word of caution may be inserted against taking the figures too literally as representing production year by year. They represent not production, but exports, and the apparent setback in the case of the Gold Coast, for example, in 1918, followed by the leap in 1919 (as well as the similar setback in 1916) was largely due to the lack of sufficient tonnage to convey the cargoes.

CONSOLIDATED STATEMENT OF CACAO PRODUCTION (NET EXPORTS) IN THE BRITISH EMPIRE COMPARED WITH THE WORLD'S PRODUCTION
10 YEARS' RECORD IN TONS

	1913	1914	1915	1916	1917	1918	1919	1920	1921	1922
West Indies—										
Trinidad .	21,483	28,325	24,143	23,969	31,314	26,178	27,117	28,009	33,588	22,609
Grenada .	5,264	5,134	6,020	5,488	5,226	6,778	4,068	4,086	4,371	3,645
Jamaica .	2,318	3,615	3,424	3,118	2,839	2,965	3,511	2,522	3,248	3,854
St. Lucia .	720	712	929	728	586	1,785	818	448	618	729
Dominica .	478	430	533	435	158	212	369	264	338	286
St. Vincent .	96	100	105	80	59	92	98	75	58	61
British Guiana .	25	22	26	21	3	4	43	10	4	nil
British Honduras	22	9	8	— ¹	— ¹	— ¹	— ¹	— ¹	— ¹	nil
Africa—										
Gold Coast .	50,553	52,888	77,278	72,166	90,964	66,343	176,176	124,773	133,195	159,305
Nigeria .	3,621	4,939	9,104	8,956	15,442	10,219	25,711	17,155	17,944	31,272
Ceylon .	3,426	2,731	4,174	3,662	3,635	3,676	2,944	2,820	3,112	4,190
Other Countries (Uganda, Mauritius, Seychelles Fiji).	5	8	14	22	8	11	68	60	20	30
Total British Empire .	88,016	98,813	125,758	118,645	150,234	118,263	241,823	180,222	196,406	225,981
Foreign Countries—										
Brazil .	29,554	40,318	42,620	42,879	55,750	43,899	62,584	54,418	42,883	45,279
Ecuador .	39,809	45,365	35,495	42,667	42,158	36,513	44,080	41,805	42,858	44,248
Venezuela .	17,138	17,349	18,262	15,196	20,044	19,765	19,834	17,598	21,898	23,500
Dominican Republic .	19,471	20,745	20,223	21,053	23,715	18,839	22,418	23,390	26,574	18,985
St. Thomas .	35,811	32,564	30,617	34,336	31,882	17,322	49,945	21,471	28,316	17,944
Fernando Po .	2,824	3,144	3,866	3,804	3,747	4,220	3,411	4,741	5,199	6,010
Other Countries ² .	22,100	24,260	20,600	22,150	19,800	21,300	22,649	20,628	22,454	27,337
Total Foreign Countries .	166,707	183,745	171,683	182,085	197,096	161,858	225,521	184,051	190,161	183,303
Total for World	254,723	283,558	297,441	300,730	347,330	280,121	467,344	364,273	386,657	409,284

¹ Official records of British Honduras destroyed by fire.

² The production of mandated territories is included in this item.

To make the statement more complete the table has been extended by the inclusion of statistics showing the total exports from the other cacao-producing countries of the world.

The main features of cacao production in the different colonies are considered geographically under countries between pp. 170-197, and opportunity is there taken to refer to certain countries not included in the tabulation as being either mandated territories or Colonies in which cacao production has not reached a stage at which it furnishes a surplus for export.

The success which has been attained in the cultivation of cacao has unfortunately been accompanied in late years by a reduction of the market price of the different descriptions. So severe has been the fall in values that it is with the greatest difficulty that West Indian planters can make ends meet, and there is reason to fear that the upkeep of estates is suffering to the eventual detriment of the Industry. As has already been noted, by far the greater part of the extension in cacao cultivation in the last decade has been carried out by the peasant proprietors of the Gold Coast and Nigeria, and it is principally the increased output from these Colonies which has precipitated the slump.

CACAO CULTIVATION AND PREPARATION.—The whole situation with regard to cacao production and consumption will be more fully examined as this chapter proceeds, meanwhile the foregoing brief statement will have enabled some of its salient features to be grasped. Before proceeding further, the leading facts regarding the product itself and its cultivation may be summarised, as some knowledge of these is necessary to an appreciation of the prospects of the Cacao industry within the Empire. Cacao, for all practical purposes, may be said to be the product of one species, *Theobroma cacao* (Linn). This is a small tree, 20 to 25 feet high, branching 3 to 4 feet from the ground, and bearing a great number of small pinkish or yellowish flowers in bunches on the stem and older branches, followed by the fruit; the latter is a large warty or furrowed (sometimes pointed) pod, 6 to 9 inches long, red, yellow, or grey when ripe. Each pod contains from twenty-five to forty large beans, closely packed in a column in the hollow centre and surrounded by a mucilaginous substance.

There are numerous more or less distinct varieties, which may be divided into two or, at most, three groups, viz. "Forastero" (foreign), "Criollo" (native), and "Calabacillo" (small calabash); the last-named, though long regarded as a form of Forastero, is now considered a distinct type. The typical Forastero has a thick and deeply furrowed bottle-necked pod, and is of a red or yellow shade; the seeds, which are large and numerous, are somewhat rounded and purplish in section; the tree is a vigorous grower, and usually a prolific bearer. Some of the best varieties of Forastero are "Cundcamar," "Amelondo," "Verdilico," and "Cayenne." The "Criollo" type (known in Ceylon as "Caracas," or "Old Ceylon Red") is distinguished by its smaller, thin-shelled and red pods, with globular seeds, which are usually white inside. The Calabacillo has usually a small and roundish pod

with a smooth skin; beans, flat, dark-purple inside. The product of the Criollo variety generally commands the highest price, but the tree is of a delicate nature, and is liable to disease, as compared with the Forastero type. Hence, the usual course on new estates is to plant one or other of the Forasteros, which also give earlier first crops and heavier subsequent yields.

The cacao tree has a long tap-root, and requires deep and well-drained soil. It thrives best in a warm, moist climate at elevations of 500 to 1500 feet (coffee and tea flourish much higher), and down almost to sea-level in Grenada and the Gold Coast, but also yields good crops in a moderately dry climate, provided the annual rainfall is not below 60 inches. The cacao leaf is very sensitive to the high winds, necessitating the provision of windbelts, and, generally speaking, it is grown in most countries under permanent shade to protect it from exposure to the sun; in Jamaica, Grenada, Dominica, and some other West Indian Islands, however, permanent shade is considered neither necessary nor desirable. The tree is pruned to encourage a spreading habit. The black vegetable mould of forest land and also volcanic soil are suitable. The general limits of cultivation are between the latitudes of 20° N. and 20° S. It prefers a mean temperature of 75-78° F., and a fall below 65° F. would have ill effects. The blossom may appear in the third year from planting, but it is not wise to allow fruit to fructify till the fourth or fifth year, and the tree does not arrive at full bearing till the tenth or eleventh year. Two main crops are produced each year (in Ceylon and the West Indies at Easter and Xmas), but a few fruits will usually be found throughout the year, and flowers and fruit are to be seen at the same time on the same tree. It is seldom in the East and West Indies that a higher average yield than 3 cwt. of dried cacao beans to the acre is obtained, this being equal to about fourteen pods per tree at the usual distance of planting. The crack estate in Trinidad, however, produces 5½ cwt. to the acre. When the pods are fully ripe the picking commences. This is done by men supplied with a specially adapted knife affixed to the end of a bamboo rod. These knives are kept very sharp, as the pod must be cut off clean without any ripping or tearing, which would materially damage the tree. Each man is attended by a woman with a basket, who gathers up the pods as fast as they are cut off. The pods are made up into heaps under the trees, and in the afternoon, when the picking ceases, they are broken. This is very smartly done by the men with a single blow of a cutlass, and the women with their hands draw out the seeds, which are covered with a semi-acid mucilaginous pulp, and place them in baskets. When the breaking is completed the beans are taken to the sweating or fermenting house. This is generally an ordinary wooden building having a row of boxes inside. The floor is usually paved, and the bottoms of the boxes are pierced with holes to allow the juice to escape. The process of sweating is a most important one, as on it the quality of the cocoa depends. Into these boxes the wet cacao beans, fresh from the fields, are placed; they are then covered with dry plantain leaves or matting, and left to ferment for about three days; they are then shifted to another box, covered up again and allowed to ferment for two or three days longer. The

object of changing them is to ensure complete fermentation, because what was on the top of the first box goes to the bottom of the second, and so on. On the fifth or sixth day it will be found that the beans have lost all their pulp and have acquired their characteristic colour. In some countries (in Ceylon, for instance) they are well washed to get rid of the remains of the mucilage before the next process of drying; the drying is carried out either in the sun or in a building. In the best practice the building consists of a large wooden platform, over which a roof runs on wheels, so that when the sun is shining the roof is rolled back and the cacao exposed; on the approach of rain the roof is rolled over again. Underneath this fixed platform there are generally two tiers of shallow drawers or trays running on rails extending outside of the building. These also can be drawn out and pushed in as required. On these trays, and on the platforms, the beans, fresh from the sweating boxes, are thinly spread and well rubbed. On the first day they are only given a few hours' sun, on the second day they "sun" a little longer, and on the third day they may be dried for the whole day. When they are thoroughly dry they are put up for shipment in bags of about 180 lb. in weight in Grenada, 165 lb. in Trinidad, 112 lb. in Ceylon, etc.

On many of the larger estates the cacao beans are now dried by hot-air process instead of by exposure to the sun.

In most countries cacao receives no further preparation than fermenting (with or without washing) and drying. In Trinidad, however, it used often to be "clayed"¹ after fermentation; that is to say, a certain amount of fine earth was sprinkled on the drying beans and rubbed in by a process called dancing. Polishing of the bean took place during claying, and is also affected to some extent while it is being dried by mechanical means. If grading is done it takes place on the drying floors, especially on those of local cacao-buying merchants; mechanical grading is also employed by means of an apparatus consisting of cylindrical sieves of different mesh arranged to form one long cylinder rotating on a slightly inclined axis; rubbish and poor beans are separated at the upper end, cacao of medium grade in the middle, and the beans of the best quality at the lower end.

CONSUMPTION OF CACAO IN THE BRITISH EMPIRE.—The production of cacao in the British Empire, amounting as it did in 1922 to over 4,519,000 cwt. (225,900 tons) is vastly in excess of the Empire's own requirements, which may be placed at about 57,000 to 60,000 tons, including Great Britain and Ireland, 46,000 tons; Canada, 7757 tons; Australia, 2700 tons; South Africa, 176 tons; and New Zealand, 350–500 tons. This represents an increase of 100 per cent on the pre-War consumption in the Empire.

Since cacao is in Great Britain and Ireland a dutiable commodity with a preferential rate of duty on imports from the British Empire, it is possible to give with great exactitude (1) the consumption in recent years in the Home Country, and (2) the proportion of British-grown cacao entering into consumption:—

¹ As noted elsewhere, claying has now been prohibited by law in Trinidad.

WITHDRAWALS FROM BOND FOR HOME CONSUMPTION

	At full rate of duty. cwt.	At preferential rate. cwt.	Total. cwt.
1913	463,707	(No preference)	463,707
1919 ¹	1,735,684	397,956	1,133,640
1920	63,367	768,769	834,136
1921	76,443	685,400	761,843
1922	57,543	862,480	920,023

• *Proportion British-grown (1922)=93½ per cent.*

The preference on British-grown cacao amounts to ½d. per lb. (total duty 3d. per lb. on foreign, and 2½d. per lb. on British), this being equal to 5s. 8d. preference per cwt., or £5 13s. 4d. preference per ton—a figure sufficiently high to make it certain that no manufacturer buys foreign cacao unless he requires some particular flavour that is not to be found among the fairly wide range of Colonial-grown cacaos. The tendency, in fact, for many years back has been to use more and more British-grown cacao and less and less foreign grown.

The following table shows the imports of raw cacao into Great Britain and Ireland in 1913 and 1922, together with reshipments and the net total retained :—

IMPORTS OF RAW CACAO BEANS INTO THE UNITED KINGDOM

	Quantity.		Value.	
	1913. cwt.	1922. cwt.	1913. £	1922. £
From British W. Africa . . .	181,469	1,017,659	512,639	2,116,978
„ Ceylon and Dependencies . .	45,099	22,504	164,661	93,134
„ Nauru and British Samoa . .	—	8,797	—	29,475
„ British W. Indies . . .	143,158	134,553	480,847	385,232
„ British Guiana . . .	366	—	1,417	—
„ Other British Possessions . .	774	534	3,011	1,571
British Empire Total . . .	370,866	1,184,047	1,162,575	2,626,390
Foreign Countries Total . . .	328,771	96,927	1,119,998	301,830
Total Imports . . .	699,637	1,280,974	2,282,573	2,928,220
Reshipments . . .	135,559	368,380	475,013	839,776
Net Imports . . .	564,078	912,594	1,807,560	2,088,444
Equivalent (tons) . . .	28,204	45,629		

The imports into Australia in 1921–22 amounted to 6,038,302 lb. (2700 tons), value £160,521, against 6,692,058 (2987 tons) in 1920–21. Of this quantity 1,780,155 lb. (1,955,210 lb.) arrived from the British West Indies ; 488,497 lb. (1,790,193 lb.) from British West Africa ; 713,216 lb. (535,408 lb.) from Ceylon ;

¹ Preference from June 2nd (1919).

and 462,004 lb. (352,762 lb.) from Samoa. Brazil (413,432 lb. against 82,929 lb. in the previous year) and Ecuador (550,930 lb. against 652,487 lb.) also sent considerable quantities, and there are signs of a tendency for the Brazilian (Bahia) sorts to replace the British West Africa sorts which they resemble. New Zealand's imports of 1,202,300 lb. (537 tons) in 1922 were derived from Western Samoa, Ceylon, British West Indies, Ecuador, New Hebrides, and Brazil in the order named.

CACAO BUTTER.—It must be explained at this stage (for the benefit of the general reader) that in the preliminary manufacturing operations the cacao bean yields two main products. The first product is ground cacao bean, from which some of the cacao butter has been expressed. This is cocoa or cocoa powder. The second is cacao butter—an important, and separate, article of commerce. It is the most expensive of the vegetable fats and is used principally in the manufacture of eating chocolate, along with sweetened cocoa powders and flavouring ingredients. At the time of writing it is quoted 1s. 2d. per lb., or £5 16s. 8d. per cwt., with Trinidad middling red cacao at 44s., and F. F. Accras ex quay Liverpool at 31s. per cwt. Cocoa manufacturers often dispose of their surplus cacao butter and there is a regular market in this article. There is the same preference on cacao butter entering Great Britain from the British Dominions as there is in the case of cacao beans. Much of it comes from Holland—2,630,951 lb. out of a total of 2,724,597 lb. valued at £165,597 in 1922. None, or very little, comes from the British Empire, but there have been suggestions in recent years that it might be well to erect cacao butter extracting plants in some of the Colonies, particularly for the treatment of defective beans and to save freight. Many good authorities, however, are of the opinion that the plan proposed is commercially impracticable. The following table shows the imports of cacao butter into Great Britain and Ireland in 1912 and 1922, but it represents, of course, a very small fraction of the total consumption of cacao butter :—

IMPORTS OF CACAO BUTTER INTO THE UNITED KINGDOM

	Quantity.		Value.	
	1913. cwt.	1922. cwt.	1913. £	
From Foreign Countries	18,239	24,323	122,035	165,579
„ British Empire	2	3	124	18
• Total Imports	18,241	24,326	122,159	165,597

WORLD'S CONSUMPTION OF CACAO.—Since the consumption of cacao within the Empire only amounts to about 57,000 tons out of an Empire production of 225,900 tons and a world production of over 400,000 tons, it is important to study world consumption, and this is summarised in the table below, which for convenience covers the same years as the table of production on p. 163

THE MARKETING OF CACAO IN THE UNITED KINGDOM.—The two important markets for cacao in Great Britain are those in London and Liverpool, and

the greatest imports of cacao take place at these ports, Liverpool being considerably the more important centre from the point of view of volume of imports. Cacao is dealt with in these markets largely on a c.i.f. basis, but business is also done on a f.o.b. basis and on spot. There are occasional public sales of cacao in London at the Commercial Sale Rooms, Mincing Lane, and auctions are also sometimes held in the sale rooms of particular brokers. The

WORLD'S CONSUMPTION OF CACAO BEANS

	1913	1914	1915	1916	1917	1918	1919	1920	1921	1922
United Kingdom										
(a)	23,285	24,925	40,270	29,296	41,293	56,200	56,682	41,706	38,092	46,001
Canada (a)	3,168	3,181	2,689	4,579	2,929	9,516	6,308	6,531	8,416	7,757
South Africa	46	55	55	130	419	342	64	154	240	176
Australia	639	806	806	4,403	2,893	4,055	3,110	4,549	2,987	2,700
New Zealand	228	303	260	406	314	387	576	496	334	537
U.S.A. (b)	68,078	71,550	85,490	97,414	157,277	144,676	172,226	131,009	130,343	142,670
France (a)	27,610	26,085	35,269	37,156	42,459	38,768	51,583	45,287	36,404	38,568
Italy	2,457	2,275	6,514	6,744	5,450	5,844	6,168	4,590	4,183	4,812
Spain	6,166	6,910	6,716	7,441	8,048	9,049	7,664	8,530	7,953	8,496
Switzerland	10,248	10,078	17,249	14,705	12,638	18,059	18,378	10,483	6,389	2,986
Sweden	1,470	1,779	4,493	3,323	2,439	2,525	4,526	3,489	1,917	3,417
Denmark	2,052	1,922	2,678	3,100	3,402	1,052	5,016	2,629	3,045	1,943
Norway	1,203	1,443	1,751	1,946	1,784	1,602	3,578	3,392	3,569	2,199
Russia	5,224	4,246	5,634	4,323			0	20	1,171	884
Germany (a)	51,053	50,000 ¹	45,000 ¹	15,000 ¹			20,000 ¹	45,007	103,004	84,005
Austria	6,157	6,900					668	1,813	4,574	2,327
Czecho Slovakia.	—	—					1,678	2,721	3,915	3,883
Holland (c)	29,980	32,091	40,955	20,019	7,862	2,384	36,921	25,384	28,784	36,137
Belgium	5,998	6,350			—	—	8,118	6,232	9,220	8,685
Other European Countries	1,632	1,476	751	536	544	457	363	1,019	1,572	1,229
South and Cent. America (d)	1,620	1,223	1,310	1,540	1,867	3,111	2,285	3,571	3,018	3,000 ¹
Total	248,314	253,598	297,890	252,061	291,618	298,027	405,912	348,612	399,130	402,412

(a) Duty payments. (b) Based on Messrs. Lee & Co.'s figures. (c) As accounting for these high figures it may be mentioned that Holland is a large stock-holding country, also a manufacturer and exporter of cacao butter and cacao powder to other countries, notably Switzerland, whose imports of raw cacao beans show a falling off partly for this reason.

total quantity of cacao sold in auction is, however, small as compared with the quantity changing hands through private contract. The usual London terms are prompt one month, discount $2\frac{1}{2}$ per cent, tare and draft allowed. The Liverpool terms, on the other hand, are fourteen days prompt, with $2\frac{1}{2}$ per cent discount. Cacao is sold on description before arrival, and on sample if the produce is already in this country. Transactions taking place in London are under the rules of the London General Produce Brokers' Association.

¹ Partly estimated.

Cacao butter is sold per lb. in cases of 2 cwt. net on the usual public sale terms and conditions.

IMPORTERS' CHARGES ON CACAO IN BAGS

RECOGNISED PUBLIC BONDED WAREHOUSES OF THE PORT OF LONDON

Landing and Delivery Rate, including :—

Lighterage from ship, landing, sorting externally, lotting,	s.	d.
average sampling from 30 per cent. Taring, housing, 14 days'		
rent from first landing and delivery	10	0 per ton
No discount, plus War Increase 55 per cent.		
Rent after above 14 days at 6d. per ton per week.		
Less discount 12½ per cent, plus War Increase 47½ per cent.		

Consolidated Rate, including :—

Lighterage from ship, landing, weighing, <i>bulking</i> , sampling,	
taring, housing, 6 weeks' rent from date of ship breaking	
bulk, and delivery	9½ per cwt.

Sorting (minimum, 1d. bag)

Less 12½ per cent discount, plus War Increase 55 per cent.	1 „
Rent after above 6 weeks at 6d. per ton per week.	
Less 12½ per cent discount, plus War Increase 47½ per cent.	
Port of London Rate 10d. per ton net.	

CHAPTER V

GEOGRAPHICAL SURVEY: CACAO

1-5. THE CACAO INDUSTRY OF THE BRITISH COLONIES IN AFRICA: GOLD COAST COLONY, NIGERIA, SIERRA LEONE, MANDATED SPHERE OF THE CAMEROONS, EAST AND CENTRAL AFRICA

[Revised to January, 1924, for general data; statistics complete to December 31st, 1922.]

Cacao in the Gold Coast Colony: Exports from the Gold Coast. Cultivation, Producing Areas and Cost. Diseases and Pests. Preventative Measures Against Diseases. Quality of Gold Coast Cacao. Inspection of Cacao. Transport in the Gold Coast Colony. Steps to Improve Transport. The Future of Gold Coast Cacao. Methods of Sale. Selling Descriptions. Average Prices. The Cacao Export Duty. Freight Rate. Nigeria Exports: Areas of Cultivation. Work of the Agricultural Department. Fermentation. Inspection. Transport. Export Duty. Cacao in Sierra Leone, The Cameroons, and East and Central Africa.

1. CACAO IN THE GOLD COAST COLONY

EXPORT TRADE IN CACAO.—Export trade in cacao from the Gold Coast commenced with a shipment of 80 lb. in 1891; by 1896 the shipments amounted

to 86,854 lb., and thereafter they roughly doubled themselves every year until 1902. The figures at five-year stages may be given :—

1896 cwt.	1901 cwt.	1906 cwt.	1912 cwt.	1917 cwt.	1922 cwt.
775	19,603	179,504	772,940	1,819,280	3,186,100
1923 (approx.) 3,880,000 cwt.					

The distribution in the pre-War year, 1913, and in 1921 was as follows :—

	1913		1921	
	tons.	£	tons.	£
To United Kingdom . . .	26,652	1,322,113	46,947	1,764,674
Germany . . .	15,460	753,878	30,586	1,066,920
France . . .	8,441	413,179	11,895	428,009
U.S.A. . . .	1	48	25,029	868,256
Holland . . .	—	—	13,985	478,353
Togoland . . .	—	—	1,363	38,950
Italy . . .	—	—	500	14,029
Norway . . .	—	—	1,699	66,466
Other Foreign Countries . .	—	—	1,191	38,409
British Possessions . . .	—	—	0	1
	50,554	2,489,218	133,195	4,764,067

The total export year by year from 1913 onwards can be followed in the general table published on p. . . It will be noted that the U.S.A. now take large direct shipments from the Gold Coast ; this trade sprang up during the War, and in 1919 no less than 69,447 tons went direct to the States, ships being specially chartered for cacao cargoes.

The exports to Togoland are, of course, transfrontier trade from districts that can take advantage of the railway that runs from Lome (French Togoland) parallel to the Eastern Boundary of the Colony. Germany's imports of Gold Coast cacao were unexpectedly heavy in 1921 (comparing with 5067 tons in 1920 and nil in 1919).

CULTIVATION, PRODUCING AREAS AND COST.—The Gold Coast is the principal cacao-producing country in the world and has occupied this position since 1911, when it passed St. Thomé and Ecuador in the tonnage of its shipments. The cacao is grown by native farmers in the rolling country, rising to 250 feet and commencing not far inland from the coast, having Coomassie, with its system of motor roads branching in all directions, as the principal transport centre. This cacao-growing area is roughly triangular in shape, measuring about 160 miles along the shortest side and 190 from base to apex. It contains, therefore, about 15,200 square miles, or 9,728,000 acres. By including the areas on the fringe of the present cacao-growing districts the "cacao belt," as it is called, may be raised to perhaps 24,000 square miles. Two railways, one from Secondee and one from Accra, run inland and meet at Coomassie, where at present they stop, and cultivation is densest along these routes, shading away in the remoter areas, but still being everywhere visible.

The total acreage under the product must be very large indeed, and the development, in the transformation it has brought about, is quite comparable with the rubber industry in Malaya.

Many of the plots are small—an acre or two only; others must be of a fair size, for not a few natives claim to collect 2000 loads (of 60 lb.) a year.

YIELD AND COSTS.—It is impossible to obtain any definite information as to average yields, and the most extraordinary estimates are current regarding these. For data of any pretensions to accuracy we must go to the reports of the yields at the various agricultural experiment stations, and these are for very small areas indeed, and for land cultivated on a very different system from native farms.

In the report of the Gold Coast Government Agricultural Department for 1921, the one-acre plots of Amelonada variety at Coomassie and Assuantsi yielded 947 lb. and 796 lb. respectively. Other details from the report are as follows :—

Farm. Station.	Varieties.	Acreage	Yield of cured cocoa per acre. lb.	Yield of cured cocoa per tree. lb.
Aburi	Amelonado . . .	—	—	5·2
	Cundeamor . . .	—	—	1·4
	Ocumara . . .	—	—	1·5
	Pentagona . . .	—	—	0·01
	Criollo . . .	—	—	2·06
Coomassie	Amelonado . . .	12	517	—
	Cundeamor . . .	4	425	—
	Ocumara . . .	4	464	—
	Criollo . . .	8·5	302	—
Kibbi	Amelonado . . .	1·15	1·051	3·45
	Cundeamor . . .	2·08	296	·98
	Ocumara . . .	·79	402	1·32
	Criollo . . .	·43	592	1·94

The Amelonado variety of Forastero, therefore, shows the best results. "I should think," writes Mr. Gerald Dudgeon, C.B.E., Director-General of Agriculture for British West Africa, "it would be a good native farm that yielded over 2 lb. per tree."

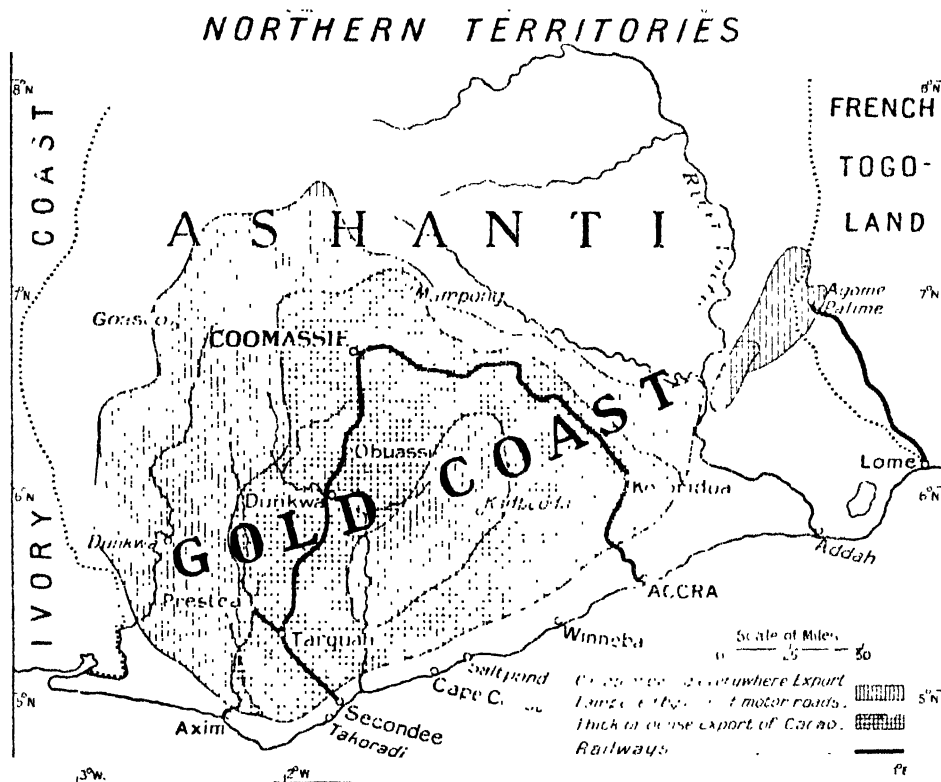
As regards cost of production on the spot, there is a similar difficulty in obtaining facts. A figure of 2s. 6d. per load of 60 lb. on the farm, or, say, $\frac{1}{2}$ d. per lb. (against the Trinidad planters' cost of 3d. per lb.) has obtained considerable publicity and has been quoted officially, but it is not stated whether this is for farms employing outside labour or for family labour only.

Another statement made on native authority is that "a man may start a farm with practically no capital but his own labour and eventually with his family can produce about 15 cwt. annually."

As a matter of fact, the phrase "cost of production" loses all significance when applied to production with family labour, and there should be substituted

for it the minimum sum at which the native seems willing to continue to grow and sell cacao. This figure, judging from shipments made and prices realised during 1923, is not above £20 to £23 per ton on the farm (2½d. to 2¾d. per lb.), which would give the native family producing 15 cwt. annually an income of £15 to £17 5s.

The rapid development of cacao cultivation conclusively proves that it has been found to be very lucrative in the past. Prior to the introduction of cacao the natives were content to exploit the indigenous products, such as palm oil and kernels, rubber and kola, but at no time did the total value of these



products exported in any one year approximate to more than one-fourth the annual value now of the cacao crop. And although other crops have been introduced and brought to their notice, notably coffee in pre-cacao days and, latterly, Para rubber, etc., their cultivation has never been seriously considered; and they have latterly also to a large extent neglected the exploitation of the indigenous products—in many cases even neglecting to grow food-crops in favour of imported European foods.

Speaking generally, the cacao plantations, once established, are treated like ordinary native indigenous products, and the bulk of the cultivation they receive is associated with the collection of the crop. The Industry is still of

comparatively recent birth, and the people are not alive to the possibilities of disaster overtaking their farms. The warnings and advice of agricultural officers have done much to educate them, not only with regard to proper methods of cultivation, but also in the preparation of the product; but something more is required, and this many of the more enlightened farmers themselves realise. If present methods are not improved it may well be that established farms will become increasingly less productive, should they not be killed out altogether. Complaints are even common that the older farms are now giving less crop.

DISEASES AND PESTS.—Hitherto the Gold Coast plantations have had a remarkable spell of immunity from serious destructive epidemics of disease and pests. Indeed, it has been averred with a certain amount of truth that “you cannot kill a cacao tree in this country.” The most destructive pests so far have been *Sahlbergella* Sp. and *Helopeltis bergrothii*; the former goes under the local synonym of “Sankonuabe,” signifying in Fanti “go back and pluck palm nuts”—an indication that the people realise the damage it is capable of doing. This pest has been most destructive of young trees, and latterly has not caused much alarm since a new farm on a different site could always be opened. It has been asserted, and fairly conclusively proved, that this pest is always most destructive where the soil conditions are least favourable, but latterly it seems to be causing damage on the older farms, no doubt due to their increased debility. Other pests and diseases, however, are also present, some of which are akin to those which are known to cause enormous loss and damage in other countries. One, namely, “Brown pod disease,” is usually associated with a canker of the stem and branches of the trees, and its presence and increase may have serious consequences.

PREVENTATIVE MEASURES AGAINST DISEASES.—Investigations into the treatment of the above diseases have long been occupying the earnest attention of both the Research Branch and the travelling officers of the Agricultural Department. Affairs in this respect are slowly coming to a head and drastic measures to prevent the spread of pod disease are contemplated. These should be effective without more than a temporary slackening in the output of cacao, for out of the 24,000 square miles of cocoa belt, certainly not more than about one-eighteenth is at present actually under cultivation, so that there is ample space for fresh farms.

The Bill by which it is proposed to deal with the situation is the “Injurious Pests Ordinance,” introduced and read for the first time before the Legislative Council at the latter end of 1923. The Bill gives the Government wide powers in regulating the purchase and import of economic plants, and in prescribing treatment against the attacks of insect or vegetable pests. It provides for the examination of farms by Government inspectors, who will have power to administer a first treatment to any disease or parasite found, and to prescribe what further action must be taken by the farmer, while no farm will be allowed to fall out of proper cultivation unless every plant covered by the Ordinance has previously been destroyed. The question of compensation, if it should arise, is to be left to the discretion of the Governor. As is usual with legislation of this nature, the provisions are general, and the actual procedure will be

more clearly defined from time to time by Orders in Council, when the onslaught of some pest is directly threatened. A memorandum by the Director of Agriculture says the Bill is rendered necessary by the increasing prevalence of injurious pests in cacao, by which he estimates *20 per cent of the crop valued at over one million pounds sterling is lost annually*, and he suggests it is a duty of the first importance to prevent plantations being destroyed.

QUALITY OF GOLD COAST CACAO.—The quality of Gold Coast cacao is, of course, relatively low, and it commands almost the lowest market price, about 10s. to 15s. per cwt. below that of Trinidad. On the other hand, it supplies a demand, for, though not highly flavoured, it furnishes a good, sound, cheap ingredient of chocolate, of which it forms the bulk. It has its place in the cacao market and there is no reason to doubt that it will keep it provided the farmer can be induced to pay more attention to cultivation and the preparation of the crops for export. In that case a far better and more reliable grade would result. The question of a better-prepared bean is a very important one, and it is one to which the Agricultural Department has been paying close attention. It is satisfactory to be able to record that progress, although lamentably small, has been made. The work has been seriously retarded by the manner in which the merchants generally—there have been exceptions—have hitherto bought up any kind of cacao brought to them. Lately some attempts have been made to pay a better price for better prepared cacao, but they have not been sufficiently universal to impress the majority of the farmers. Until merchants generally adopt some system of paying by grading, progress will be slow. It is, however, satisfactory and a hopeful sign for the future that the chiefs, brokers and farmers themselves are now, by means of Associations, doing their utmost to discourage the marketing of bad beans.

INSPECTION OF CACAO.—A rather complex situation has arisen with regard to the inspection of cacao before export. The Government suggests inspection at the ports. The native growers want it carried out at certain definite up-country buying stations (doing away with road-side buying) and to include the penalising, by infliction of fines, of the farmer who prepares his cacao badly. They say they could themselves carry out such inspections efficiently, and pay its costs from the fines collected, and that so long as the careless farmer can get a ready sale for the poor stuff, the general standard of Gold Coast cacao is lowered in the estimation of the world-market, and there is no inducement to the conscientious farmer to take more trouble and turn out a better article. The merchants (or some of them), on the other hand, maintain that the quality is steadily improving without inspection, which they do not want at all.

The most universal system of fermentation is to heap the beans in the farm in a square made with plantain stems covered with plantain leaves. Sometimes a hole is made in the ground. Baskets, from small sizes up to 15 or 20 loads capacity, and wooden packing cases or properly made boxes in increasing numbers, are also used here and there throughout the country. The length of fermentation given varies, but six days is now very well known and this is only varied to suit individual convenience. Turning or mixing the cacao while under fermentation is very irregular and often neglected, and rain often

penetrates the fermenting mass, resulting in an unequal product. A common mistake, especially during a dull market for the product, is that the bulk of the pods are allowed to get over-ripe on the trees; the pods are also frequently heaped for a good many days before they are broken, both practices resulting in a high percentage of germinated beans. When brought from the fermenting mass, the cacao is not washed, but merely dried in the sun. Some have made concrete floors in imitation of the mercantile firms, but the majority use palm leaf mats on the ground, or on a raised platform two feet above the ground. The final drying, however, is often done on the bare ground.

TRANSPORT IN THE GOLD COAST COLONY.—As already noted, the chief cost of cacao at the coast ports is made up, not of cultivation, but of transport expenses. Transport rates work out as follows per ton mile :—

Head Transport	d.
Lorry "	0
Road-rail "	9
	0

Railway—first 50 miles, 7½d.; second, 6d.; third, 4½d.; fourth, 3d.

To give a few actual instances, the cost of moving a ton of cacao from Kade—the centre of a rich cacao district—in Akim Abuakwa to Accra was recently calculated to be £10 15s., equal to 5s. 9d. per load, or 1·15 pence per lb. From Oda in Akim Kotoka the cost of conveying a ton of cacao by lorry to Saltpond was £8 13s. 0d. From Nioso in the Western Province to Secondee the cost was no less than £26. In view of these figures, which have doubtless suffered some reduction during the past year, the great advantage to farmers of proximity to a railway will be realised. It is to remedy existing defects that the Government is now doing its utmost to increase communications to make them both adequate to deal with trade and cheap enough to defeat competition. The great increase in production during the War was far in advance of the communications that, although such were by no means neglected, it was possible to make during a period of enforced economy and small staffs. During the past four years the pace of motor-road making has been phenomenal—over 2000 miles having been constructed—and some 140 miles of railway have been built. The use of motor transport has much increased.

But there are still large tracts of the cacao belt from which, according to Government officials, it does not yet pay to export cacao (except during very high prices) owing to the cost of transport; in the Central Province alone it is estimated that some 7000 tons, and in the western areas of the Colony and Ashanti another 5000 tons, do not reach the market. Another big expense is lighterage and steamer rates, simply because the former is carried out in open roadsteads where handling is slow and expensive; where ships are delayed by slow loading and therefore have to charge higher rates to cover their cost while at anchor; and where all cacao, even if well fermented and prepared by the farmer, is damaged by sea-water. Incidentally, is it fair to put all the blame on the Gold Coast farmer for his badly prepared cacao?

STEPS TO IMPROVE TRANSPORT.—The steps being taken by the Government

to extend and cheapen the transport facilities of the Gold Coast to meet coming competition include, with regard to ports, the provision of a deep-water harbour at Takoradi, on which construction was started in 1921, after an extensive survey of the coast line. The cost of £1,600,000 covers two protecting breakwaters, enclosing a sheltered anchorage in which about a dozen steamers can lie in from 25 to 50 feet of water within 200 to 300 yards of wharves erected on the leeward side of the main breakwater; large import sheds, export sheds and cacao storage accommodation for 10,000 tons of cacao; manganese bins and timber jetty; construction of a railway (5 miles) to the Secondee-Coomassie line two miles north of Secondee; the erection of travelling cranes; construction of main roads, water supplies, electric lighting, a hospital, and many buildings for the construction staff, which will be of permanent use. It is hoped that the harbour will be completed some time in 1925, and it is expected that with the construction of a tarret road to Secondee the rapidity of shipment (which will be at a rate only limited by the ship's capacity to work her hatches) and the large wharfage accommodation for cacao will then obviate the necessity for any mercantile warehouses at Takoradi. In addition to Takoradi, extensive improvements to warehouse accommodation at both Accra and Winnebah have been recently carried out, and better facilities for railways and beach space at Accra.

Three new lines are required, viz. :—

- (1) To tap the hinterland of the Central Province of the Colony—from a point on the Secondee-Coomassie railway to the neighbourhood of Kade.
- (2) To tap the western part of the Western Provinces of the Colony and Ashanti.
- (3) To tap the Northern Territories.

Labour and finance limit railway construction to one line at a time, and Government is now considering the first-named alone. Its cost is estimated at £1,250,000.

The result should be to reduce the present heavy cost of transport of cacao from Kade (see above) to the neighbourhood of £4 7s. od. a ton, a saving of £6 8s. od., making it probable that the local farmer will benefit to this extent (or thereby) in higher prices for his produce.

That all railway construction will not only reduce costs, but actually bring about a big increase in the quantity of cacao arriving at the ports cannot be doubted, but during the period of construction there is bound to be considerable diversion of labour to works on the railway. In discussing the question of transport mention should be made of the part now coming to be played by the French railway to Palime in developing the cacao industry of the Eastern Province of the Gold Coast. Buyers from Palime are now buying cacao in Tsito and Peki in this Province. From Tsito the cacao is carried by lorries to Palime, a distance of nearly sixty miles. It appears a large reduction in railway freight from Palime to Lome makes it possible for the buyers to pay prices which they would not have dreamed of a little while ago. Cacao exported through French Togoland has the further advantage of entering France at a preferential rate of duty. (A limit known, is placed on the quantity).

THE FUTURE OF GOLD COAST CACAO.—The general view regarding Gold Coast cacao is that the outlook is for very greatly increased output in the future. This is the opinion of the great majority of authorities consulted in the preparation of this book. It is also the official view. On the other hand, there is one considerable authority who holds the opposite opinion, justifying it on the ground that as many old cacao farms are going out of bearing (owing to lack of cultivation) as new ones are coming into production. Owing to lack of labour it is a physical impossibility, according to this gentleman, for the cacao crop to be increased beyond a point which has now been reached or nearly attained.

There are other limiting factors at present, notably transport, as just mentioned, low prices—which the Gold Coast native likes as little as any other producer¹—reduced productivity of some of the older plantations, the ravages of disease (*supra* p. 174) and damage to the moisture-retaining properties of the soil through extensive deforestation in some districts. Observers who have recently returned from the Colony, however, report young cacao to be seen everywhere.

The effect of disease can, of course, never be predicted, especially in a country like the Gold Coast, where control is difficult, and the expectation of its incidence must, therefore, be left on one side in a general survey, attention being merely called to the presence of the factor. Disease-control measures, which are likely to be more drastic than in other countries because the native cannot be relied upon to follow out careful methods of treatment of the trees intended to attain the same end, are also sure to affect production to some extent.

Nevertheless, with all these considerations prominently in mind, as they must be to observers on the spot, the local view is that a very large increase can be counted on in coming years—certainly an average of 200,000 tons for the next five years, and an average of 220,000 tons for the following five years, and possibly more.

The greatest limiting factor is labour. The Agricultural Department estimate that, using only one-ninth of the cocoa belt, the soil is capable of producing 284,000 tons per annum.² The export of 1922 could, therefore, be almost doubled if sufficient population was available. Exhaustive enquiries are being conducted to ascertain as closely as possible the productive power of the population, which a “preliminary, but conservative, estimate” places at about 300,000 tons.

• It is no exaggeration to say that the supposed potential output of the Gold

¹ As an example, it may be mentioned that at Suhien and Asuboi (Eastern Province) recently, meetings were held to discuss the question of withholding cacao from sale. Though no decision was come to by the Association on the matter, there was, later on, not only some holding-up of cacao, but some (unofficial) interference with persons who did wish to sell, carry or buy cacao. Some members of this Association are firmly convinced that, if the Association comes to a decision on such a matter, it is within the power of the Association to force farmers and others not members of the Association to agree.

² A check on this estimate shows that it is based on an average of $3\frac{1}{2}$ cwt. yield per acre.

Coast is the nightmare of cacao planters in other parts of the world. Even the local agricultural authorities and administrators entertain apprehensions regarding it.

These apprehensions are based on three considerations :—

- (1) The probability of the supply being too great for the demand.
- (2) The risk of overplanting defeating itself through the extensive destruction of forests which it involves, thus creating conditions detrimental to the growth of cacao ; the rainfall on the Gold Coast is already the lowest of any cacao-producing country in the world, but unfortunately this is a consideration which is unlikely to appeal to the natives until too late.
- (3) The danger of the Gold Coast becoming a one-product country," with all the risks that involves.

As regards (1) it may be said that the question is reserved for consideration in the final chapter, as it can hardly be brought under review without taking into account the production of other countries. To a great extent, however, the demand for Gold Coast cacao must depend on improvement in its preparation in the Colony. The fears entertained under all these heads have led to recommendations being made to the Government on several occasions by Mr. W. S. D. Tudhope (Director of Agriculture). So long ago as 1918 he suggested (Interim Report, p. 9) that

"In view of the present magnitude and actual and potential value of the industry to native owners and to the Colony, and of the risks attendant on the wholesale extension of plantations persisted in by natives in past years . . . an order should be issued prohibiting further planting, except vacancies in existing plantations, for a certain number of years."

Again in a later report he wrote :—

"Having thus been so far very successful with this crop, and having due regard to the state of misery to which the people themselves would be reduced, the stagnation of trade with its serious losses, alike to the Mercantile Community and Government, should conditions be rendered either unfit for cocoa, to survive or the plantations be wiped out by diseases or pests—not impossible, or, indeed, improbable contingencies—it behoves us not to shut our eyes to the dangers, but to do everything we can by regulation, if necessary, to guard against them.

"Hitherto no restrictions whatever have been put on the destruction of forests or in the extension or maintenance of farms, and it is here a danger lies. Enormous areas of forest land have everywhere been cut down for cacao, and when one considers that it is undoubtedly due to the huge extent of forests and its concomitant humidity more than to anything else that cacao can be successfully grown in this country, since we have the lowest rainfall of any cacao-growing country in the world, it seems to me of vital importance that regulations restricting destruction of forests should be introduced before it is too late.

"It may be recounted that the enlightened Omanhene of Akim Abuakwa (Honourable Ofori Atta, C.B.E.) did introduce some regulations enforcing reservation of certain areas in his division a few years ago, and certain Headchiefs in Ashanti have also done likewise, but a much wider application of the principle is necessary all over the country,

and, I think, ought now to be enforced in the general interest of the community as a whole.

"At the rate of destruction indulged in during the past twenty years it is unpleasant to conjecture what may happen within the next few decades. The object, I think, could be attained by prohibiting further destruction of forests in planting cacao within certain defined limits."

No definite action appears yet to have been taken upon these recommendations, which is no doubt owing to the difficulty of enforcing them; experience gained in connection with the rubber industry in the East may, however, eventually be applied. Deforestation is yet far from general, and it is its possible extension that constitutes a threat to the permanence of the Gold Coast industry.

METHODS OF SALE.—At the close of the War there were no less than 98 European and 292 native firms or individuals exporting cacao from the principal ports, of which the greatest is, of course, Accra. These figures, however, included any branches which the same firms might maintain at different ports, and latterly the number of exporting firms has decreased. Probably there are now fewer than 100 native firms of exporters. It is probable that the native shippers have been chiefly responsible for the exports of inferior material. Few of them have suitable storage and they do not take the care in selection, drying and sorting during storage, which the European firms exercise. Cacao stored under open verandahs of dwelling-houses, or under under tarpaulins in the open air never or seldom turned, cannot keep good for a length of time, and such has been the storage given much of the cacao, at least in Accra, during past years.

Some export merchants employ their own agents, store-keepers or factors—practically always natives—to buy cacao direct from the producer; in some cases the employee has to furnish some kind of security for good faith. Cash, buildings, scales, sacks, etc., are provided by the employer, and a salary or wage is usually paid, in addition to a commission on each load of cacao bought. The factor, on his own initiative, usually employs sub-buyers, to whom he advances cash and who receive a share of the commission. These sub-buyers set up stalls on the roadside, or buy at the bush farms and villages and engage carriers to transport the cacao to the "factory" (West African for warehouse). The buying price is naturally fixed by headquarters from time to time.

The main part of the crop, however, is probably bought in the first case by a class of middlemen calling themselves "cocoa contractors" or "free-sellers." Some of them are men of considerable affluence and influence; they own or rent their own premises, provide their own sacks and scales, and disburse their own cash in buying. Their purchases are hawked amongst the different exporting firms and sold to the highest offers. Sometimes a contract is entered into with one or other of the exporting firms for delivery of a definite amount of cacao of a standard quality within a given period at a price agreed upon. Their operations do not differ much from that of the factor class already referred to, except that the former are notified a certain price has to be paid,

whereas the latter have no such restrictions, and their only incentive is to get the cacao as cheaply as possible.

There are also numerous petty buyers in various districts who call at isolated farms, etc., and endeavour to "turn a penny." Many are Hausas.

A system of licensing buyers, as is done in the West Indies, Ceylon, the Federated Malay States, etc., is under consideration. Cacao is usually sold by the head-load of 60 lb. and exported in bags, 16 to the ton.

SELLING DESCRIPTIONS.—Gold Coast cacao is sold in the consuming markets as :—

No. 1. Accras or Good Fermented. This contains, say, 5 per cent defective and 5 per cent slaty beans.

No. 2. Accras or F.F. (Fair Fermented) Accras. This may contain up to 12 per cent defective and 12 per cent slaty beans.

F.A.Q. Accras (Fair Average Quality). This may contain 12 per cent defective and up to any percentage of slaty beans, i.e. wholly unfermented cacao may be delivered under the description.

In the case of F.F. Accras and F.A.Q. Accras, the arrangement is that the seller makes an allowance to the buyer when the percentage of defective beans is higher than that noted above.

AVERAGE PRICES.—Average prices on the Gold Coast have been (per ton over all exports):—

	£	s.	d.		£	s.	d.
1910-1913 . . .	22	4	0	1918 . . .	27	1	9
1914 . . .	33	0	0	1919 . . .	46	19	10
1915 . . .	47	5	0	1920 . . .	80	11	11
1916 . . .	53	6	6	1921 . . .	35	15	4
1917 . . .	34	11	11	1922 . . .	36	13	4

prices in Liverpool have been (No. 1 Accras):—

1920		1921		1922		1923	
High.	Low.	High.	Low.	High.	Low.	High.	Low.
£126	£38	£47	£36	£48	£38	£39	£31

THE CACAO EXPORT DUTY.—An export duty of $\frac{1}{4}$ d. per lb. was originally placed upon cacao in October, 1916, which was reduced to one-fifth of a penny per lb. in 1917 and increased to $\frac{1}{2}$ d. per lb. in 1919. It remained at this figure until August, 1922, when it was reduced to $\frac{1}{4}$ d. on condition that, if revenue proves later to have been seriously impaired by the reduction, reversion to the old duty will have to be considered. This step was taken in order that the farmer should receive more for his cacao, and that the distance from which cacao can profitably be brought to market should be increased, thereby rendering larger supplies available for export.

The sums received in revenue from the cacao duty since its imposition in 1916 to 1921 are as follows:—1916, £32,586; 1917, £212,045; 1918, £131,097; 1919, £419,028; 1920, £580,456; 1921, £622,153. Total, £1,997,347.

Freight Rate : 30s. per ton Gold Coast to United Kingdom ports.

2. THE CACAO INDUSTRY OF NIGERIA

Nigeria occupies the second position in West Africa as an exporter of cacao. The shipments in 1921 amounted to 358,888 cwt., and in 1922 to 625,440 cwt. (compare 72,428 cwt. in 1913), and while the Gold Coast has trebled its exports in the last decade, Nigeria has increased her production between eight and nine times.

The division of the shipments is principally between the United Kingdom and Germany, the former having taken in 1921, 213,474 cwt. (1913, 39,731 cwt.) and the latter 102,655 cwt. (1913, 32,697 cwt.). As in the case of the shipments to Germany from the Gold Coast (p. 171) this was a big increase on the previous year, 1920, when only 7253 cwt. went to Germany.

The distribution of exports in 1922 was as follows :—

CACAO SHIPMENTS FROM LAGOS IN 1922

	cwt.	£
To United Kingdom	319,956	426,213
France .	24,840	32,666
U.S.A. .	90,689	139,983
Holland .	62,737	92,447
Italy .	3,551	5,636
Germany .	121,943	171,165
Belgium .	1,404	2,419
	625,120	870,529

AREAS OF CULTIVATION.—Much of the information given regarding the Gold Coast applies in almost equal degree to Nigeria, and the questions of cost of production and native methods of cacao cultivation need not again be brought under review.

One of the best cacao growing districts in the Southern Provinces of Nigeria is north of Lagos around a place on the railway called Agege, and south of an important town called Abeokuta, placed at the foot of a granite hill from which the stone for the large protecting breakwaters of Lagos Roads, more than sixty miles away, was got. Agege itself is within 15 miles of the Port of Lagos, and so is favourably situated for transport. The best cacao grown in Nigeria comes from this district, and the fact that British manufacturers have opened buying centres in the area has no doubt done much to help this result.

North of Agege, the next nearest cacao centre is Ibadan, 118 miles inland from the port of Lagos. This is undoubtedly the largest cacao district in Nigeria, as in the year ending March, 1922, the railway transported over 16,000 tons from Ibadan, as against over 4000 tons from Agege. The Ibadan district comprises an area of over 60 square miles, as far as Oshogbo to the North and Ife to the East. The quality in the Ibadan district is improving, probably owing to the influence of the native agricultural societies, of which there are three, and to the fact that the Agricultural Department concentrate more on this area.

Nigeria, of course, is famed for its palm oil, and it is interesting to note that at Agege we have the cacao district, and for a distance of 100 miles there is no cacao at all till Ibadan is reached, when the cacao area extends for another 70 miles.

WORK OF THE AGRICULTURAL DEPARTMENT.—As the Agricultural Department in Southern Nigeria owns only a few acres of very poor cacao it has been impossible to obtain results bearing on the many problems relating to this crop. The past attempts to instruct growers have, it is recognised, been too diffuse, and for various reasons have not been very effective. During 1922 small central fermenting and drying-houses were erected at eight points in the Oyo Province. The farmers were invited to bring in their cacao on the understanding that the produce would be returned to them unless they liked to leave it for sale in bulk, the only condition being the provision of free labour for building houses. Altogether some 35 tons were fermented and sold for the growers at prices representing premia of £3 to £5 per ton above the highest prices obtainable for best f.a.q. in the district, and much higher premia above those paid by traders for ordinary inferior f.a.q. cacao. The prices obtained were also always a few shillings higher than those offered for best fermented cacao in small lots. Allowing for repairs to houses, etc., the cost of carrying out the fermentation should be well under £2 per ton, so that the work is economically sound, even on the basis of the premia obtained so far and with daily paid labour. The experiment will be carried further, and an endeavour will be made to establish co-operative societies on a financially independent basis.

FERMENTATION.—The process of fermentation has hitherto been conducted in the most haphazard fashion. Very little attention is paid to the drying process. Cacao must be dried or it deteriorates when stored, awaiting shipment. The mixing of dried with undried beans is a common practice, and despite continuous warnings of its evils very few signs of improvement are as yet shown. The grading of Nigerian cacao at present is hardly practicable. If the farmers would only grade their own cacao before putting it on the market, keeping well-fermented from the under-fermented, abstracting all germinated and broken beans, the task would be lighter and the grading made possible. The British manufacturers maintaining buying stations pay a higher price for the better quality, irrespective of the ruling market price, whereas the merchants pay a standard flat rate, ruled, of course, by the markets at home. In the former case, the farmers now realise that they can get a better price for the good article, which is encouraging them to take a greater interest in its preparation.

The method of fermentation adopted by many of the farmers is to place their beans in a heap covered with leaves, etc., or in a kerosene tin or barrel. With a view to a more uniformly fermented product, the beans are occasionally stirred whilst fermenting is in process. The period usually allowed is about three or four days, irrespective of the size of the heap or climatic conditions. The effect which fermentation has on the interior of the beans is not usually considered. Some of the farmers are now, however, more enlightened and are

adopting better methods. When dried, well-fermented and cured beans crackle when lightly pinched.

INSPECTION.—A system of inspection by native Produce Inspectors of the Customs Department prior to export has been in operation, but this has just been superseded and the duties of the native Inspectors taken over by the Agricultural Department, who in their zeal for the good name of the Nigerian cacao may be expected to put a stop to the shipment of the worst qualities.

Prior to organising the new system of inspection, Mr. Faulkner, the Nigerian Director of Agriculture, had a meeting in Liverpool with representatives of the Liverpool and Manchester Chambers of Commerce and the Association of West African Merchants,¹ who, it is said, all expressed themselves in favour of inspection, if efficiently done. Their view was that it tends to improve quality and condition and that the extra price obtained owing to this improvement would easily pay for the cost of inspection, which should be self-supporting.

TRANSPORT.—Pre-eminently the greatest difficulty in trying to develop the cacao industry in Nigeria is the lack of roads and railways, apart from one or two well-served centres. Districts such as Ife are a great distance from the established centres, and the cost of transport is so heavy as to make the price offered in these districts negligible. It does not pay the farmer for his labour. The farmers have not forgotten the boom, which left all its evil effects and did nothing to improve the industry. The Administration are, however, building roads to-day which lead through dense undergrowth to the cacao farms in the valleys, and it is no uncommon sight to meet two-ton lorries heavily laden on these roads bringing in their produce to Ibadan. At the present time cacao planting is in the hands of the natives, and will continue to be, owing to the fact that the Government will not allow Europeans to take up land freehold for the purpose of farming.

EXPORT DUTY.—Export duty at the same rate as in the Gold Coast Colony, viz., £2 6s. 8d. per ton, is levied in Nigeria, and the Governor recently stated that its retention had been decided on.

FREIGHT RATE.—Thirty shillings per ton, Lagos to United Kingdom ports.

3. CACAO IN SIERRA LEONE

Cacao is grown in one or two localities in Sierra Leone, but little attention is given to the crop. There are no extensive areas suitable for big cacao plantations except, perhaps, in the Eastern part of the Colony, but many a little plot might be grown in the sheltered valleys along the lower slopes of the mountain range in the peninsula. The exports in 1922 amounted to 145 cwt. (value £171) of which 111 cwt. was shipped to the United Kingdom and the balance to Germany.

¹ The desirability of inspection is still being strenuously argued between the various Chambers of Commerce and at the time of going to press the publication of a memorandum on this subject by the West African Section of the London, Liverpool, and Manchester Chambers of Commerce is momentarily expected. The position at present seems to be that the Liverpool and Manchester Chambers are in favour of inspection while the London Chamber is against it.

4. CACAO IN THE BRITISH SPHERE OF THE CAMEROONS

The British sphere in the Cameroons is, of course, mandated territory, and as such not properly within the scope of this volume. Statistics of the cacao shipments from Victoria may, however, be given as an indication that there is, in this territory, a considerable cacao industry, whose production must be taken into account :—

EXPORTS OF CACAO FROM VICTORIA (BRITISH SPHERE IN THE CAMEROONS) IN 1922

	cwt.	£
To United Kingdom . . .	18,902	41,334
„ Germany . . .	16,164	26,404
„ Holland . . .	6,006	13,544
„ U.S.A. . . .	12,556	28,318
„ France . . .	3,856	4,802
„ Duala . . .	10,731	19,293
	64,215	133,695

These exports are all of “ domestic produce,” and compare with only 15,091 cwt. (£31,680) in 1921.

5. CACAO IN EAST AND CENTRAL AFRICA

Little information can be given regarding cacao in East Africa, and it hardly figures at all in the export statistics. There were about 300 acres under cacao in German East Africa (now Tanganyika Territory) in 1913, and in Uganda quite considerable areas were planted under European auspices, the acreage in 1919 having been given as 4431; the 1922 Blue book, however, gives the area under cacao in Uganda at only 868 acres over 5 years of age, and 5 acres below that age, and it is common knowledge that large areas have been allowed to revert to bush. The exports of cacao from Uganda and Kenya in 1922 amounted to 565 cwt. (value £2370) against 329 cwt. in 1921 (value £1475). Almost all was shipped to the United Kingdom.

CHAPTER VI

GEOGRAPHICAL SURVEY: CACAO (*continued*)6-11. THE CACAO INDUSTRY OF THE BRITISH WEST INDIES AND
BRITISH GUIANA

[Revised for general data to January, 1924; annual statistics complete to December 31st, 1922.]

Trinidad and Tobago: Exports of Trinidad Cacao. Position and Prospects of the Industry. Cost of Production. Scheme of Development. Export Duty. General Information. Cacao in Grenada: Export Duties. Cacao in Jamaica. Cacao in Dominica. Cacao in British Honduras. Cacao in British Guiana.

6. THE CACAO INDUSTRY OF TRINIDAD AND TOBAGO

The Colony of Trinidad and Tobago forms the most important cacao-producing group in the British West Indies. The trees are of mixed varieties of the Forastero type, and Trinidad cacao is considered the most uniform of all the cacaos, and to take rank immediately after Ecuador in point of quality. "Claying" of the beans, in vogue until a recent date—the object being the prevention of mildew, and advantage in appearance and weight—has just been prohibited by law under a severe penalty, including the case of a licensed dealer in cacao the forfeiture of his licence. The beans are large, broad and more or less flat, with shell of red-brown hue and kernel red, violet or red-brown. They possess a pronounced fine chocolate flavour when properly fermented. The relative standing of Trinidad cacao may be judged from the average prices of 1922, viz. Trinidad, 66s.; Grenada, 56s.; Accra, 45s. 6d.

GENERAL VIEW OF THE TRINIDAD CACAO SITUATION

	Exports.			Total Exports. lb.	Price in London.			Average freight rate per 20 cwt gross.
	U.K. lb.	Canada. lb.	U.S.A. lb.		Jan.	June.	Dec.	
1913	3,925,782	689,948	23,682,478	48,116,377	69/-80/-	72/-78/-	66/-75/-	45/-
1914	7,310,166	709,296	31,304,260	63,447,876	60/-68/-	57/-64/-	75/-78/-	45/-
1919	11,186,395	1,285,536	24,255,041	60,743,283	90/-	119/-121/-	128/-131/-	160/-
1920	12,618,253	1,614,159	26,414,472	62,741,172	124/-131/-	125/-140/-	68/-77/-	160/-
1921	4,945,958	2,456,217	45,600,514	75,238,566	68/-77/-	52/-64/-	48/-61/-	100/-
1922	4,822,753	1,506,268	26,285,313	50,645,635	50/-61/-	65/-75/-	55/-65/-	75/-
1923				67,692,275	58/-68/-	49/-60/-	45/-54/-	67/6

Wages paid to labour on Cacao Estates, Trinidad: *Pre-War*, 25c. to 70c. per day, according to class of man. *Present*, 35c. to \$1 per day according to class of man.

¹ Quotations from C. M. and C. Woodhouse's Report. Lowest "middling red" price to highest "fine to superior."

EXPORTS OF TRINIDAD CACAO.—The exports in 1922 (452,191 cwt.) were the smallest for nine years, in sharp contrast to 1921, when they attained the highest figure on record (671,773 cwt.). Apart from this, the general tendency over a period of years has been upward with a bumper crop at intervals. The high figure attained in 1921 appears to have been due to the fact that, in 1920, the crop was very late, leaving much of it to be shipped in the following year. The main cacao crop in Trinidad and Tobago being harvested in the months of October, November, December and January (and to some extent, February), it is easy for fluctuations in the exports from year to year to be produced by early or late crops, and this must always be taken into consideration when studying the statistics.

POSITION AND PROSPECTS OF THE INDUSTRY.—It is much to be regretted, in view of the long and honourable record of Trinidad as a cacao producer, that the Industry of the present time is far from prosperous. This is due more than anything else to the period of low prices—extending now over four years—from which the Industry has suffered, the average price having been barely sufficient (and in cases of low yielding estates, actually insufficient) to cover the costs of cultivation, preparation and handling. The blame is, of course, placed on the huge ever-increasing output of lower quality peasant-grown African cacao. High rates of freight and heavy taxation are other handicaps. A similar state of matters rules in other islands of the British West Indies and, to avoid repetition, it will be as well to summarise here the general situation. As an illustration of the plight in which agriculturists find themselves, and particularly cacao planters, it may be mentioned that, in one of the smaller islands, the Registrar of the Supreme Court reported that during the year 1922 as many as fifty-two orders for sale of lands, thirty-three orders to value lands, and thirteen orders appointing receivers were made by the Court. These orders, totalling ninety-eight, were greater in number than all the orders made in any one year since 1909. In these circumstances the Governments have obtained authority either to make loans, or to guarantee them against the security of the crops. In Grenada the loans have been in kind, namely, fertilisers instead of money. Such loans have naturally taken priority over other mortgages, and some dissatisfaction has been caused thereby.

The agricultural depression is naturally reflected in the commerce of the Colonies, especially as many merchants have made large investments in agriculture (principally in the form of loans). There has been an increase in the number of commercial failures.

The situation in Trinidad has been, to some extent, relieved by the announcement that a Government Agricultural Loan Bank, to lend money on first mortgage and on crops is to be set up. The capital is limited to £150,000, to be raised by Government loans: the bank to be authorised to make loans on first mortgage, and on crops only when it is proved to the satisfaction of the Board, with the help of the Agricultural Department, that the security is sound and that there is a good margin of safety. The step is one which has practically been forced on the Government by the fact that the finances of the Colony are, to a large extent, dependent on the solvency of the cacao industry. The

amount of any mortgage on any one estate, until further experience has been gained, is not to exceed £2000, and the amount to be lent on the security of the crops of any one estate not to be more than two-thirds of the estimated value of the crop and not to exceed £1000. Should the depression affecting the Industry prove to be of a temporary nature, the action will be fully justified.

COST OF PRODUCTION.—Cacao estates vary much in merit and yielding power. It is still thought possible that an average crop of 10 bags per 1000 trees (equal to 3 bags of 165 lb. or 4·4 cwt. per acre) can be made to pay the expense of employing a competent manager, plus 7 to 8 per cent on the capital invested. The average cost of production might, in such circumstances, be kept as low as \$10·00 per bag. Where the average yield is less than this, which is, it is to be feared, the case on the majority of estates, and the cost of production higher, the continuance of production resolves itself into a question of the proprietors being willing or not to "sit tight" and nurse the property until better times come round.

The full particulars regarding acreage,¹ yield and cultivation on which alone could be based a full appreciation of the cacao situation in Trinidad, as well as in the rest of the West Indies, are lacking, but data are available upon the production costs of several well-managed estates.

The following was the showing in 1922-23 on Hermitage Estate, having about 35,000 bearing trees, which gave a yield equal to 12·5 bags per 1000 trees or 3¾ bags or 5½ cwt. per acre. The total crop, therefore, was 437 bags, which was 200 bags over 1921-22 and 100 bags in excess of previous best. It is, therefore, fairly evident, that the result is in a large degree due to the excellent crop:

COST OF PRODUCTION: HERMITAGE ESTATE

Manager's Salary	912·00
Overseers and Watchmen	556·10
Cultivation—	
Brushing and Weeding	550·60
Pruning	415·75
Supplying	322·31
Drains	163·56
Forking	1452·22
Nurseries \$17·07 and Vermin \$110·35	127·42
Live Stock grown pastures \$19·80	169·97
Supplies—Tools, Bags, etc.	207·12
Taxes—Licences, etc.	240·82
Roads and Windbreaks	195·62
Repairs to Buildings	147·07
Reaping	767·14
Drying, Bagging, and Crooking	275·50
Advances to Contractors	131·63
437 Bags Cacao at 13·35165 lb. net (sold)	5837·58
	5182·61
	654·97

Trinidad Freight Commission—\$1·12 per bag, or 7½ per cent on present prices.

¹ Since the above was written, the Trinidad Warden's report for 1922 is to hand. It shows a

Even more interesting results are reported by the Elianina Cacao Estate, the comparison available in this case extending over ten years. This estate consists of 100 acres under cacao, with 24,500 bearing trees, 2500 half bearing trees and 2850 "supplies" and missing. Trees are planted 12 by 12 feet, and are twenty-five to thirty years old for bearing trees. Yield per 1000 trees equals 11 bags of 165 lb. equals $3\frac{1}{2}$ bags (or 5.15 cwt.) per acre from bearing trees. The cultivation was thickly shaded by the "Bocare" Imortelle, but this has been reduced by 50 per cent. The average yearly rainfall is about 85 inches.

COST OF PRODUCTION : ELIANINA CACAO ESTATE 1922-23

	Cost per bag, \$
Supervision	1.66
Stock	0.60
Cultivation	3.92
Picking, gathering, etc.	1.74
Manufacture, garbling, etc.	0.90
Transport and railway fares	0.30
Repairs to buildings, roads	0.14
Taxes and Fire Insurance	0.21
Sundries and advances to Contractors	0.28
Total	9.75
Sale price	13.86

The net profit from the estate, after paying \$172 interest on mortgage (not included in above cost) was \$600.88. For the previous year ending June 30th, 1922, a cost of \$11.3 was recorded (profit on working \$767 and for 1920-21 the cost per bag was \$10.31, leaving \$1,005 profit on working the estate. The average cost of production over ten years was \$9.78. In two good years, 1918-19 and 1919-20, the profits were \$5125 and \$8231 respectively. The figures, of course, apply to well and commercially managed estates, and show them to be working on a very small margin; the position of less favourably situated and poorer estates can be deduced. Merely to assist this process of deduction the fact may be mentioned that one group of estates, having over 1000 acres under cacao, reports a crop average over seven years of 1775 bags of 165 lb.—say 1775 bags or 2.4 cwt. per acre, compared with the above averages of 3.75 and 3.50 bags per acre—and this is considered quite a fair yield.

SCHEME OF DEVELOPMENT.—A scheme by which it is hoped to relieve the

total area of 200,252 acres under cacao in Trinidad and Tobago during 1922, and this area yielded a crop of 48,034,864 lb., equal to an average of 2.15 cwt. per acre. The return is, of course, incomplete, but it is assumed that the crop reported corresponds to the acreage reported. Since 1922 was a small crop year—crops 45-67ths of the record crop year and 45-60ths of an average crop year—it may be taken that the average yield per acre fluctuates between this figure (2.15 cwt.) and 3.2 cwt. at very highest, with about 2.75 cwt. as a normal average over all the plantations—about the same average as is recorded for Ceylon.

present depression in the cacao industry in Trinidad and Grenada, and to obtain for the product the recognition which is due to a superior article is being prepared. Samples of chocolate and cocoa manufactured wholly from Trinidad cacao, and from the same product of the Colony mixed with that of Grenada were recently received in the island from a selected manufacturer in England. The samples were found to be of such high grade that cacao planters of the island began to consider the prospects of subsidizing a particular firm in England for the production of chocolate and cocoa from the Trinidad product and from Grenada cacao, if the planters of the last-named island would enter the scheme.

Cacao interests in both islands are now proposing to combine to embark upon an extensive advertising campaign in order to place a well-prepared brand of cacao on the market. The raw product will be sent to a particular manufacturing firm in the United Kingdom for the British consumer, the manufacturers to get a proportion of the profits which will be shared by all the producers. To cover initial and other expenses it is proposed that a small export tax should be placed on all shipments of cacao from the two islands. The feeling in Trinidad is that not only will there be a material improvement in the cacao industry, but the withdrawal of cacao produced in the two colonies from the market will mean that other manufacturers, who require the Trinidad and Grenada product for blending, will have to approach planters and shippers in the two islands with very favourable offers before they will be able to procure consignments.

EXPORT DUTY, ETC.—1½d. per 100 lb. in aid of immigration, and 2½d. per 100 lb. (on local produce only) in aid of Imperial College of Tropical Agriculture. Total, 4d. per 100 lb. The freight rate to U.K. ports was reduced in February, 1924, to 57s. 6d. per ton.

GENERAL INFORMATION.—A complete list of cacao estates in Trinidad and Tobago, with location and the names of the owners, is given in the Trinidad and Tobago Year-book (C. B. Franklin, 12, Abercromey Street, Port of Spain), price 3s. 6d.

7. CACAO IN GRENADA

Grenada usually ranks second in importance in the British West Indies for its exports of cacao, but for some years back production has been on a declining scale, with the result that Jamaica secured in 1922 the honour of second place. There are signs that the cultivation has been extended to areas where it can only be profitably grown during periods of high prices. Portions of estates are thus under a permanent cultivation, which gives a yield insufficient to cover the marketing of the crop at the present quotation. The net profit on some estates would be increased by eliminating the cultivation altogether on the less fertile sections. This is a policy that does not make a ready appeal to planters, as there is a natural disinclination to uproot existing cultivation of a permanent nature. The late period of high prices has also been the cause of over-capitalisation of estates that have recently changed hands. Many are unable to give an adequate return on the capital expended on purchase.

The shipments in 1922 were divided as follows :—

SHIPMENTS OF CACAO FROM GRENADA IN 1922

	cwt.	£
To United Kingdom	52,473	116,520
„ Canada	7,555	18,907
„ U.S.A.	8,886	23,064
„ Other Countries and balance	3,990	8,565
	72,904	167,056

The quality of Grenada cacao is high. The beans are smaller, but otherwise similar to Trinidad ; the shell is of a pale red-brown colour, and is usually loose and easily detached. The kernel is dark blue-violet, with paler fracture. The flavour is slightly bitter, but similar to Trinidad.

In Grenada cacao thrives from the sea-level to 1700 feet, but beyond 800 feet its yield is uncertain. An elevation of from 300 to 500 feet is considered to be the best. A feature of the local plantations is the use of the banana for both stake and shade when setting out young plants. Very little shade is used beyond this, for curiously enough it is found that in Grenada cacao does infinitely better when protected from the wind but exposed to the full sunlight.

FREIGHT RATE AND EXPORT DUTIES.—The freight rate on cacao from Grenada to the United Kingdom was reduced in February, 1924, from 67s. 6d. to 57s. 6d. per ton. The following export duties are levied :—

	Rate of duty per cwt. or fractional part. s. d.
(1) In the case of cacao exported to Europe—	
(a) When at the date of exportation the price of cacao in the London market as stated in the public telegrams does not exceed 50s. per cwt.	7½
(b) When such price exceeds 50s. per cwt.	3
(2) In the case of cacao exported to any country other than a country of Europe—	
(a) When at the date of exportation the price of cacao in the New York market as stated in the public telegrams does not exceed 50s. per cwt.	7½
(b) When such price exceeds 50s. per cwt.	3

8. CACAO IN JAMAICA

Jamaica cacao is described by a trade expert (Whymper) as similar but slightly inferior to Trinidad. The beans are usually flat and long and irregular in size. The poorer qualities have thick shells and are moist to the touch, the kernel is brown or purple-violet and the flavour slightly aromatic and rather bitter and harsh.

The area under cacao cultivation in Jamaica is reported as 15,219 acres in 1922, against 18,014 in 1921 and smaller acreages in previous years, falling back to 11,236 in 1913. These figures are, however, open to a certain amount of doubt.

The exports were 42,584 cwt. (*unrevised figure*) in 1923 and 77,075 cwt. in 1922—a record figure—and 64,960 cwt. in 1921; the distribution in the last-named year was

	cwt.	£
To United Kingdom	39,387	59,080
„ British Possessions	7,062	10,593
„ U.S.A.	9,935	14,902
„ Other Countries	8,576	12,864
	<hr/> 64,960	<hr/> 97,439

It is a point worth noting that the much smaller crop of 1920 was valued at £211,882. The exports in 1922 were valued at £138,300.

The position of the cacao planters in Jamaica is very similar to that of their confrères in Trinidad—though the island as a whole is less dependent on this crop—and a scheme has been adopted by the Jamaica Agricultural Society for the setting up of a State Agricultural Bank with a capital of £500,000, the amount to be raised by debentures which it is proposed the Colony should issue and also by the placing of shares on the market. The proposal contemplates twice the capital approved in the official Trinidad scheme, but the principle on which the money is to be raised is on all fours.

9. CACAO IN DOMINICA

Dominica takes fifth place among the West India Islands as a producer of cacao. The 5717 cwt. shipped in 1922 is little more than half of the average export during the early years of this century. For a few years after the collapse of the sugar industry in the 'eighties cacao was the leading export. There is no doubt that the hurricanes of 1915 and 1916 dealt a severe blow to cacao cultivation, from which it has not recovered, and, since those dates, there has been little encouragement to growers for renewed action in this respect owing to low market prices and the very uncertain future, due to rapid development of planting and the enormous output of this product from the British West African Colonies. Another adverse factor is the competing attractions of lime cultivation, the value of the several products of which amounted to the considerable sum of £176,800 in 1921, when the shipments of cacao were valued at only £12,628.

10. CACAO IN BRITISH HONDURAS

Two wild varieties of cacao are native to the Colony of British Honduras, one bearing a brownish-yellow pod somewhat rounded at the ends, the other a pointed red pod. They occur in the forests of the hilly districts in the south and west.

Cultivation of cacao have been made on the Sittee River and elsewhere, but cover no extensive area. They consist of varieties brought from Trinidad, but include a few trees of the wild kinds. Very satisfactory growth is obtained on the valley soils adjoining the river. The tree suffers if exposed too completely on the higher sides of the valley. There have been no traceable exports in recent years.

,II. CACAO IN BRITISH GUIANA

Cacao grows well on the lands of the Berbice and Demerara Rivers in British Guiana, while its cultivation is also carried on along the banks of the Essequibo and the Pomeroon and in the North-Western District. There are large areas suitable for cacao growing. The Government have an experimental area of cacao at Onderneeming, Essequibo, where from selected trees of high yield and good quality seeds are obtained for propagating purposes. The area reported as being under the crop at the end of 1922 was 1370 acres, against 1176 acres in 1921, 1846 acres in 1920, and 2147 in 1919 (1863 in 1913). These returns show the area as being less than is actually known to be the case, though owners in some instances describing parts of their young cacao cultivation as being under ground provisions, with which products your cacao is usually planted.

Practically the whole of the cacao of British Guiana is fermented for three or four days and is then sun dried. One estate possesses an artificial dryer and several proprietors are contemplating adding others. The fermenting boxes are generally well made and great care is usually exercised in fermenting and curing the beans.

British Guiana cacao is of high quality. Practically only the Criollo and Forastero varieties are cultivated and the beans are large. When exported the cacao usually fetches a good price and this is mainly due to the care in fermenting and curing.

The great bulk of the cacao produced is required for local consumption, and the exports are, therefore, but small. The local demand is steady and very fair prices are generally realised.

CHAPTER VII

GEOGRAPHICAL SURVEY: CACAO (*continued*)

12-15. THE CACAO INDUSTRIES OF CEYLON, THE MANDATED TERRITORY OF WESTERN SAMOA, THE NEW HEBRIDES, AND NEW GUINEA

Cacao Acreage in Ceylon. Production and Exports. Yield. Labour. Cultivation. Weeding. Fermentation and Curing. Grading and Sorting. Western Samoa. New Hebrides. New Guinea.

12. CACAO IN CEYLON

ACREAGE.—The amount of land suitable for cacao cultivation in Ceylon is limited. Practically only the country north of Kandy presents suitable soil and climate. The rest of Ceylon is either too wet or the land is not good enough. It is the local experience that the product cannot be successfully grown under

500 feet above sea-level or above 2500 feet, and flourishes best at about 1200 feet. The acreages reported under cacao cultivation in recent years have been

1914	1919	1920	1921	1922
34,100	31,200	31,800	33,200	33,230

TYPE AND QUALITY.—The cacao originally grown in Ceylon was the Venezuela Criollo type, generally known as the Old Red Ceylon. This variety produced a high-grade product, but has gradually been replaced by the hardier and more prolific Forastero.

Forastero was first introduced about 1878. The change was probably due to the Old Red Ceylon being more susceptible to disease, and less able to withstand the long periods of drought which occur in the cacao-growing districts. Although the Old Red is a finer grade, and commands a higher price, the heavier yields from the Forastero compensate for lower market values. It should be mentioned that, although the Forastero in other countries is dark and strong, in Ceylon, on account of hybridization, climatic conditions, methods of preparation, or other causes, it very closely resembles the Old Red type in producing a light-coloured product.

PRODUCTION AND EXPORTS OF CACAO FROM CEYLON.—There are no figures for production as distinguished from exports. The latter amounted to 60,284 cwt. in 1923 and 83,210 cwt. in 1922, as against 62,244 cwt. in 1921. The 1922 shipments were the largest since 1915. The export distribution was as follows (principal countries only):—

	1921 cwt.	1922 cwt.	1923 cwt.
To United Kingdom . . .	17,398	19,960	24,424
U.S.A.	7,703	23,898	8,368
Philippine Islands . . .	17,512	19,770	24,539
Canada and Newfoundland	5,125	5,965	4,130
Germany	2,426	3,066	1,944
Belgium	—	1,471	205
New Zealand	2,040	1,910	740
Africa	2	1,481	222
Straits Settlements . . .	1,625	434	504
West Australia	1,351	583	406
South Australia	40	75	40
Victoria	4,749	1,721	3,250
New South Wales	1,220	886	963
Queensland	9	91	60
Spain	350	388	275

YIELD.—In Ceylon the “spring” crop, picked in May, June, and July, is usually small. The main or autumn crop is gathered in November, December, and January. The average crop varies very much, from 2 cwt. or less to 5 cwt. per acre, but on a well-managed estate 3 cwt. is probably a good average. The figure of 4 cwt. and over as a ruling average for a whole estate has been obtained on one or two particularly well-situated and well-cultivated estates, which are also free from disease.

Taking 30,000 acres as the area in production and making some small addition to the export figures to represent the consumption of the single chocolate works in Ceylon (the Peradeniya Chocolate Co.), it will be seen that the 3 cwt. average has not been attained for the whole island even in the record year just recorded, while in ordinary years it has often been below 2 cwt. This is partly to be accounted for by the ravages of canker, which are such that resort has to be had to continual replanting. Hence the acreage of old trees may not be so great as assumed in the calculation made above. Unfortunately it is the finest and most valuable varieties that are the worst sufferers by disease. The following table shows yields on some individual estates :—

YIELDS, COSTS, ETC., ON CEYLON CACAO ESTATES

Estate.	Acres.	Average Yield per acre		Cost of production per cwt. f.o.b. Colombo 1922-23	Sale Price 1922-23	
		1921-23 cwt.	1922-23 cwt.		s.	d.
Kondesalla and Mahaberia tenne (Dumbara Dist.)	1,150	4.52	4.67	(¹)	53	9
Rajawella	3,392(²)	3.29	2.00	(not stated)	54	4
Ratwatta	176	2.22	1.36	Rs. 38.16	Rs. 41	41
Yattawatte	414(³)	2.22	2.35	(not stated)		
Tea Corp.	184	1.50	1.80	(⁴)		
Matale Valley	65	3.47	2.10	(not stated)	Rs. 41	00
Warriapolla	509(³)	3.91	3.00		59	1½

(1) During the past ten years the costs have varied between 25s. and 68s. per cwt. f.o.b. Colombo. With the variation of crop, exchange and other uncontrollable conditions the cost under average conditions is about 35s. per cwt. f.o.b. Colombo. The greater part of the cacao is Forastero, but there is also a small amount of Caracas (Criollo).

(2) Part through rubber and coco-nuts.

(3) Through rubber.

(4) "Small loss on production."

LABOUR.—The labour required for a cacao estate works out at about one coolie for two acres. Tamils generally form the bulk of the labour force, but the Sinhalese are also employed for lopping, etc. A coolie's task at picking is reckoned at 1 to 1½ bushels of wet beans a day. This is equal to about 37 lb. of the cured produce.

CULTIVATION.—The usual method of cultivation in Ceylon is to fork the soil every two years, followed two or three months later with an application of about 700 to 800 lb. per acre of artificial manures. The manure used is a general mixture containing nitrogen, phosphoric acid and potash. Some favoured estates have cattle establishments, and are able to treat a part of the acreage with cattle manure. The higher average yields from these estates show that this procedure is a sound one. The dadap is used for shade. These trees are not allowed to grow too large, and new shade is regularly obtained by replacing with fresh trees those that have to be cut out.

WEEDING.—Cacao estates are kept clean weeded from the time of opening the expenditure after the third or fourth year being very small on account of the shade.

FERMENTATION AND CURING.—The period of fermentation in Ceylon is about thirty-six hours. After twelve hours the beans are given a light washing and turned over into another box. They are again given a heavier washing at the end of the fermenting period of thirty-six hours, when they are carried or carted to the barbecue, or curing house. The best method of curing is the gradual drying of the beans in the sun on barbecues covered with coir matting. By this method the best quality is obtained. The period varies from five to seven days, according to temperature. Most of the picking has, however, to be done during the wet season, and a greater part of the crop of Ceylon is cured by artificial means. The most popular curing-house is a two- or three-floor building, the floors being constructed by strips of wood covered over with coir matting, on which the freshly fermented beans are spread. The building is heated with hot air conducted by pipes placed under each floor, the hot air being obtained by means of a fan, which drives the air through the heating apparatus and then through the pipes. The temperature in the building during the curing process is kept between 110 and 120° F.

GRADING AND SORTING.—After the beans are cured, they are sorted into different grades: first quality, which is composed of only the large round beans; second quality, flat and small beans; and third quality, known as garblings, consisting of the shells and broken beans. Well-prepared first-quality Ceylon cacao is graded as a "fine" sort, and fetches a high market price. Its aroma is not strong, but its general appearance is very pleasant. The beans are round and light-coloured. Their skins are smooth and uniform. This cacao has a light "break" and is used in high-grade confectionery. All Ceylon cacao is not, however, first quality, and a quantity of inferior grades find their way to the markets. Cacao, after grading, is packed in bags (112 lb. to a bag).

VALUES.—The average annual shippers' buying prices from 1911 to 1921 were: Rs.38.60 per cwt.; 1912, Rs.37.88; 1913, Rs.44.03; 1914, Rs.37.76; 1915, Rs.37.48; 1916, Rs.38.57; 1917, Rs.24.84; 1918, Rs.31.99; 1919, Rs.53.08; 1920, Rs.44.60; 1921, Rs.28.23; 1922, Rs.37.77.

FREIGHT RATES AND EXPORT DUTY.—The Homeward Conference Freight Rates to the United Kingdom on cacao in bags or casks (14 cwt. to the ton) is 45s. To Fremantle, Adelaide, Melbourne, and Sydney the rate is 55s., and to Brisbane (direct) 67s. An export duty of Rs.1.50 per 100 lb. is levied.

13. THE CACAO INDUSTRY IN THE MANDATED TERRITORY OF WESTERN SAMOA

After the War the plantations which had belonged to the German companies passed to the Government of the Dominion of New Zealand which undertook the mandate. The New Zealand Government administers these plantations as Crown Estates¹ and intends to use the profits to supplement the ordinary revenue of the Samoan Treasury.

¹ In consequence of a recent decision tenders for leases for 40 years are now being invited by the High Commissioner for New Zealand (closing date 31 May, 1924).

The exports of cacao amounted to 15,600 cwt. in 1920 (value £90,222) and 15,000 cwt. in 1921 (value £36,363). When the islands were taken over the labour situation went from bad to worse and considerable doubt was entertained regarding the final attitude of the New Zealand Government to the importation of Chinese labour on which the estates had depended in the past. One London-owned company working rubber and cacao estates gave up cultivation. At present the New Zealand Government, whether reconciled or not to the admission of Chinese labour, allows it to be imported on a special three years' contract. The wages rate is £1 10s. monthly, plus 2s. good conduct allowance.

The plight of the European planters in July, 1922, was extreme. Not only had the quality of Samoan cacao fallen, but the financial condition and unorganised state of the cacao planters was forcing them to sell at any price they could get. The price in July and for some months prior to that month ranged from £35 to £45 per ton—a figure much below the cost of production. In these circumstances the Administration adopted proposals from the Board of Trade, whereby prices of £50 and £55 per ton were guaranteed for unwashed and washed cacao respectively, and planters were in addition given a bonus of £2 per ton for all cacao that passed a quality standard. As a result the local price of cacao rose immediately by £15 to £20 a ton. This increased price, if not really profitable, enables the planter to carry on.

It can, therefore, be claimed that the action of the Board of Trade has for the present saved the independent planters from bankruptcy. Prospects, however, are still far from bright. The Department of Agriculture report for 1922 notes that "There have been no applications during the past year for permission to open up new cultivations; this is no doubt accounted for by the high cost of labour in Samoa, which placed our plantations at a great disadvantage in competing with the products of those countries where labour is both cheaper and more plentiful."

14. CACAO IN THE NEW HEBRIDES

The New Hebrides are administered by an Anglo-French Condominium, and the figures for the considerable cacao output are, therefore, omitted from the tabulation (p. 163) giving the supply of cacao from the British Empire. It may, however, be mentioned that the area under cacao cultivation in the group is 6897 acres (300 British, 6597 French) and the estimated yield has been (1921) 5200 cwt., (1922) 22,000 cwt. The exports have been (1921) 15,440 cwt., £30,860; (1922) 21,520 cwt., £43,040. The principal British cultivation in the islands is coco-nuts, not cacao.

15. CACAO IN NEW GUINEA

No precise figures are available regarding the present acreage under cacao in the Territory of New Guinea, but the exports in 1921-22 amounted to 152 tons, valued at £9465, against 2760 cwt. in 1913. Intermediate figures since the occupation by Australian troops have been (1915-16) 186 tons, (1917-18) 144 tons, (1918-19) 112 tons, (1919-20) 140 tons, and (1920-21) 133 tons. The principal plantations are at Witu (French Islands).

CHAPTER VIII

COFFEE PRODUCTION IN THE EMPIRE

GENERAL SURVEY, INCLUDING CONSOLIDATED TABLE OF SUPPLY FROM THE BRITISH EMPIRE

[Revised for general data to January, 1924; annual statistics complete to December 31st, 1922.]

Exports of Coffee from the British Empire. Cultivation and Preparation for the Market. Arabian Coffee. Liberian Coffee. Robusta Coffee. Preparation of Coffee. The London Coffee Market. The London Coffee Auctions.

THE world's production and consumption of coffee is immensely greater than its production and consumption of tea or cacao, the average for recent years being over 17,500,000 bags—say, in round figures, 1,000,000 tons.

Since the collapse of the Ceylon coffee industry (p. 210) the British Empire, which takes so important a part in the production of tea and cacao, has counted for very little in relation to coffee production.

The following table shows the position :—

EXPORTS OF COFFEE FROM THE BRITISH EMPIRE

	1913 tons.	1920 tons.	1921 tons.	1922 tons.
India	13,408	8,664	13,424	8,687
Ceylon	9	6	79	33
Federated Malay States	742	17	15	—
Kenya and Uganda	928	7,913	4,077 ¹	6,463
Nyasaland	86	22	40	42
Jamaica	2,910	2,063	3,229	3,130
British Guiana	40	185	181	361
Total	18,123	18,870	21,045	18,716

• In addition to the above tonnage there may be taken into account the output from some of the mandated territories, of which Tanganyika is the most important—(1913) 1059 tons, (1920) 2143 tons, (1921) 3828 tons, (1922) 4271 tons.

Altogether, therefore (including the mandated territories), the British Empire produces about 2 per cent of the world's total supply of coffee (export surplus of producing countries).

The world's coffee position as a whole is overshadowed by the tremendous

¹ Nine months only, owing to a change in the financial year.

production of Brazil—fully two-thirds of the world's output—and the operation of the Coffee Valorisation Scheme. Coffee is notoriously a crop with which one year of good yields is followed by another (or two) of poor yields, and the scheme functions by taking the surplus during years of heavy production and releasing it during years when the yield is smaller. The important influence of coffee exports and prices on the national wealth of Brazil may be surmised from the following data in round figures, as extracted from official statistics :—

	Total Value of Exports. £	Value of Coffee Exports. £	Average price per bag £ s.	Average rate of exchange. d.	Balance of Trade less Annual Commitments in millions. £
1919	130,000,000	72,600,000	5 12	14 $\frac{3}{4}$	23 surplus
1920	107,500,000	52,800,000	4 11	14 $\frac{1}{2}$	47 deficit
1921	58,600,000	34,700,000	2 16	8 $\frac{9}{16}$	31 „
1922	68,600,000	44,200,000	3 10	7 $\frac{7}{8}$	10 „

The Government of a debtor country is naturally obliged to consider currency in relation to sterling.

It will be observed from the above figures that the net trade deficit for the past four years was about £65,000,000. Some allege that if there had been no valorization policy enforced the price of coffee would have remained in the vicinity of 30s. per bag, and the effect of this would have been to increase the trade deficit to approximately £100,000,000 sterling, and the rate of exchange would consequently have declined still more.

The world's coffee output, consumption and stock position is usually given for the years commencing 1st July. The visible supply at the beginning of July, 1922, was 8,576,000 bags; a year later, at 1st July, 1923, it was 5,310,000 bags, the Brazilian crop having been short. The indications are that the crop for 1923-24 will be the largest for many years. At a conservative estimate the Santos 1923-24 crop will be at least 13,500,000 bags, though some authorities put it much higher; the Rio crop, 3,500,000 and the Victoria and Bahia crops about 1,000,000 bags. Adding to these the estimated output of mild coffees of about 6,000,000 bags, a total world production for 1923-24 of about 24,000,000 bags is arrived at. The world's consumption of coffee during 1923-24 cannot much exceed 20,000,000 bags; therefore, the visible supply at 1st July, 1924, is expected to be approximately 10,000,000 bags.

There is obviously no room for further direct competition with Brazil. Happily coffee (of the best qualities) is a "fancy article," and there is always room at the top for a certain—not unlimited—production of special coffees which have won a place in public favour. It is on these that British planters at present concentrate and will be well advised to continue to rely.

COFFEE CULTIVATION AND PREPARATION FOR THE MARKET.—By far the greatest proportion of the world's supply of coffee is furnished by *Coffea arabica*, known as Arabian coffee. Smaller quantities are furnished by *Coffea liberica* (Liberian coffee) and *Coffea robusta*. Arabian coffee commences to yield in its fourth year, Liberian properly at its fifth, and Robusta in its third year.

The last named is a native of the Congo (a similar type is indigenous to Uganda), and has only been comparatively recently introduced into cultivation; it is grown principally in Java and Sumatra by British and Dutch planters, often in association with rubber, and within the last few years some interest has been evinced in its cultivation in Ceylon.

ARABIAN COFFEE.—The Arabian coffee plant is a small tree native of the tropical Africa, but introduced into all tropical countries and cultivated extensively in Brazil, West Indies, South India, Java, etc. This coffee is generally cultivated at elevations between two thousand to four thousand five hundred feet and over. It thrives best on a deep loam soil, though certain clays mixed with same give good results, especially if a fair amount of humus is present. Low-lying and damp situations induce disease. Generally speaking, Arabian coffee does best when the mean annual temperature is about 70° F., and the mean minimum temperature about 55° F. The finest flavoured coffee is, as a rule, grown at the highest altitudes. A moderately high and well distributed rainfall is also required. The usual planting distance is 6 by 6 feet, giving 1200 trees to the acre. The first yield is obtained when the trees are from four to five years old. When in full bearing, some years later, a yield of about 5 cwt. to 7 cwt. an acre¹ may be obtained from a new plantation on unimproved soil, or well kept up older estates. Under exceptional circumstances a much higher yield has been obtained.

Unfortunately, owing to soil impoverishment, disease and pests, the average yield mentioned is much above that obtained on many estates, particularly in Southern India. The failure to deal adequately with the problem of declining yields is to be attributed to lack of capital in the industry, and this, in turn, is due to the diminished earning power of the old varieties of coffee as an investment (in India).

Under the most favourable conditions, Arabian coffee trees will live 35 to 60 years, but many trees on every estate are exhausted in ten or twelve years by unskilled treatment, or the attacks of borers or leaf disease. Constant "supplying" of the vacancies has thus to go on. Permanent shade, except at low elevations, is often considered unnecessary for Arabian coffee. In South India, however, it is usually grown under permanent shade. Periodical manuring (with farmyard manure or, as in South India, with fish manure) is indispensable, and pruning is necessary to keep the trees low and spreading. Coffee being a surface feeder (though it has a tap root) grass is the weed most to be feared as it not only smothers up the ground, but exudes a poison from its roots which kills the coffee.

LIBERIAN COFFEE.—The difference between the Arabian and the Liberian coffee is great. The latter grows to be a flourishing tree of 35 feet or more in height, if not pruned. Its trunk is of a reddish-brown colour. Its berries are comparatively large and do not drop when ripe, or become soft. The permanent skin of the berry is tough and strong; and this makes the preparation of Liberian coffee more difficult than the Arabian coffee. The proportion of

¹ Mr. C. H. Lankester, the well-known coffee planting expert, gives the average yield in Costa Rica—a country known for its high standard of coffee cultivation—at over 5 cwt. per acre.

the manufactured coffee to the raw berries used is very small—about 1 to 10. In the case of Arabian coffee the proportion stands at 1 to 5. The Liberian tree blooms many times in the year, while the Arabian type blooms at most five times. This is of great advantage, since plucking is spread over the course of the whole year. There is, also, not the great demand on the resources of the tree which it would have to meet in a short space of time if it had to bring forth one heavy crop. This is the case with Arabian coffee, and is one reason why the tree is so severely affected by the leaf disease. Liberian coffee is usually planted 8 by 8 feet, and is suited for low elevations only, i.e. up to 2000 feet. The best and steadiest crops of this coffee have been grown on land of a peaty nature in low country.

ROBUSTA COFFEE.—Robusta coffee flourishes from almost sea-level to 3000 feet, and, as already noted, has been favoured as an intercrop with rubber. It is a rapid grower and a heavy yielder, giving a crop of about 1 cwt. per acre in two years from planting, 4 to 5 cwt. in the third year, while 14 to 18 cwt. has been recorded in the fourth year, and 24 cwt. per acre in the sixth year. However, so far as present experience goes, these yields are not kept up, the plant having exhausted its soil. The proportion of dry coffee to raw berries is about 1 to 4; the berries are much smaller than those of Liberian, but the beans are almost the same size, and there are more berries to a cluster, often over sixty. The plant thrives best on a loose clay loam soil.

PREPARATION OF COFFEE.—A mature coffee “cherry” consists of: (1) a coloured outer skin; (2) a thin layer of fruity matter of a light colour; (3) a network of slender filaments; (4) a gummy substance which, after fermentation, resembles mucilage, and when suspended in water, as during the washing process, quickly assumes a flocculent form; (5) the parchment, or cartilaginous membrane, which covers the “silverskin”; (6) the pellicle called the “silver-skin”; (7) two semi-elliptic seeds, or one elliptic seed (Peaberry), composed of a horny albumen which surrounds the embryo or rudimentary plant. The method of preparation for the export market may be briefly described. The processes are: pulping, fermenting, washing, drying and hulling, but the last-named is not necessarily performed on the estate or indeed in the country of origin.

The coffee cherries as received from the estate go into receiving tanks filled with water, where lights and cherries dried on the tree are floated off for separate treatment; they then pass to the pulping machines, where by the action of a rough revolving cylinder, the outer layer is converted into pulp. The pulp is separated from the seeds by mechanical stirring in another vat or tank, and the seeds—still covered with their parchment and the slimy layer of gummy substance—go next to the fermenting tanks, where they are allowed to ferment for a time that varies in different countries. Over-fermentation causes the defect known as foxy beans (reddish in colour). Such are offensive in odour, and a few of them will spoil the liquoring of a consignment of coffee. Another effect of over-fermentation is to cause adhesion of the silverskin. From the fermenting tanks the coffee passes to the washing channels, where they are cleansed in running water; at the same time further separation of the light

interior coffee takes place, the "lights" going off in the overflow. This separation enables better results to be obtained in the hulling and grading process of the better grades, and may also eliminate hand-picking. Where there is an insufficient supply of running water, coffee may be washed in tanks. The latest method is to employ a coffee washing machine of the Harper-Townshend type. This eliminates all handling of the coffee beans from the pulper to the drying tables. It is fed automatically from the fermenting tanks; and, after loosening the saccharine matter from the parchment by a semi-dry process, it washes the coffee centrifugally in a running stream of clear water, separates lights and heavy, and delivers them on to a draining table.

Drying takes place generally speaking on barbecues (stone floors) exposed to the sun with or without sliding roofs to keep off the rain. Drying on trays is also practised, and mechanical driers are employed in some cases. The dried beans are now in the state known as "parchment coffee." The final operations of hulling or "cleaning" (removing the parchment and the "silverskin") and grading are carried out by means of hulling and grading machines, either in a central factory serving numerous estates in the same neighbourhood—as the machinery is expensive—or at the port of shipment, or in the country of destination. The question whether to clean and grade coffee locally or export it in the parchment is one for individual decision, depending on local circumstances. There is often considerable advantage in sending coffee to London in the parchment, as the London wharfingers grade according to the needs of the markets.

IMPORTS OF COFFEE INTO THE UNITED KINGDOM

COFFEE NOT KILN-DRIED (ROASTED OR GROUND)

	Quantity		Value	
	1913 cwt.	1922 cwt.	1913 £	1922 £
From British W. Africa . . .	44	5	137	17
Union of S. Africa . . .	—	578	—	2,323
British E. Africa . . .	10,056	89,728	44,525	408,233
Aden and Dependencies . . .	5,343	3,667	21,151	18,895
British India . . .	67,439	67,078	267,190	386,640
Straits Settlements and Dependencies (including Labuan) . . .	—	2	5	10
'British West India Islands	6,189	3,443	24,607	17,119
British Guiana . . .	876	2,030	2,590	5,549
Other British Possessions	652	1,186	2,233	5,374
from British Empire . . .	90,599	167,717	362,438	844,160
„ Foreign Countries . . .	776,872	921,202	2,558,417	3,581,646
Imports . . .	846,471	1,088,919	2,920,855	4,425,806
Reshipments . . .	514,634	295,993	1,842,248	1,091,958
Net Imports . . .	331,837	792,926	1,078,607	3,333,848

THE LONDON COFFEE MARKET.—London largely undertakes the arbitration on coffee contracts, even though they are made between countries of production and Continental ports, and sustained efforts on the part of the Coffee Trade Association of London (founded in 1916), point to a probable growth in the importance and influence of the market in future.

THE SORTING, WORKING AND WEIGHING OF COFFEE.—Imported coffee, on arriving in London, is sent direct from the ships to one of the following wharves : Metropolitan and New Crane, Symon's, Willson's, New Hibernia, Red Lion, Port of London Authority and St. John's. Symon's Wharf and St. John's Wharf have no machinery for milling coffee. In its state on arrival at the wharves it may be (1) neither cleaned nor graded, or (2) foreign cleaned but not graded, or (3) both foreign cleaned and graded. Indian coffees fall in the last-named class. East African and other coffees in all the classes ; the great bulk is at any rate foreign cleaned. Coffee requiring both cleaning and grading can be submitted to both operations at the wharves and Port of London Authority.

Coffee in parchment, that has to be prepared for sale in London passes through sieves to rid it of foreign matter ; it is next milled to break the parchment, which is then either drawn off by suction or by air-blast. After this the coffee is graded, and lastly each size is bulked.

The method of grading adopted in the London market is to divide into the following sorts :—

Elephants, i.e. over-grown berries.

A—bold.

B---mediums.

C—thirds.

Triage and chips.¹

Peaberry.

The last-named is in some cases divided into bold, medium and small. The procedure with coffee, which has been " foreign cleaned " and " foreign graded," is first of all to sort the marks ; the bags are then opened and inspected by the wharfingers, and placed to their correct piles according to quality, etc., and then bulked. Bulking, it will be seen, is the regular practice, whether grading has been done at the source or not. After bulking, samples representative of the whole are taken by the wharfingers or Port of London Authority, and the coffee is refilled into bags which are weighed at this stage for the Customs registration. An allowance is made by H.M. Customs to account for the weight of samples drawn.

" Lotting accounts," together with the samples, are then sent to the brokers for the preparation of the auction sale catalogues. The samples are exhibited in the brokers' sale rooms in Mincing Lane prior to the auction, and small samples in the wharfingers' own papers as guaranty of authenticity are given to the wholesale buyers, who roast and liquor them and buy on their opinion. As will have been gathered, the grading of coffee by the wharfingers is primarily a matter of sizes and bulking of similar descriptions, leaving the quality of each

¹ Berries broken in cleaning.

lot still a matter to be decided upon by the buyer inspecting samples ; the great importance of accurate grading (nowhere carried out more admirably than by the London wharfingers) is obvious from the fact that the degree of roasting required by "Elephant" would char Grade "C" to a black cinder. In the auction catalogues the various lots of coffee are, of course, distinguished by mark, country of origin, ship and wharf lot, as well as by the grades that have been assigned them according to the above classification.

The following are the various importers' charges in connection with the operations that have been outlined :—

COFFEE IN BAGS

CLEAN

Consolidated Rate, including :—

s. d.

Lighterage from ship, landing, weighing, bulking, taring, sampling, housing, 6 weeks' rent from date of ship's report and delivery . 9½ per cwt.

Sorting (minimum 1d. per bag) 1 ..

Less 12½ per cent discount, plus War Increase 55 per cent

Consolidated Rate, as above, also including sizing or grading at working on gross weight 1 6 ..

Consolidated Rate, as above, also including polishing and sizing or grading at working on gross weight 1 10 ..

No discount, plus War Increase 55 per cent

Sorting (minimum 1d. per bag) 1 ..

Less 12½ per cent, plus 55 per cent

If polishing and/or sizing are ordered *after working* the following charges apply in addition to the usual *Consolidated Rate* :—

Polishing and sizing on gross weight and sorting 1 6 per cwt.

Sizing on gross weight 1 1 ..

Reweighing and repiling in addition 4 ..

Plus War Increase 55 per cent

IN HUSK

Consolidated Rate, as above, also including :—Husking, polishing, sizing, weighing before husking if required.

In parchment on gross weight before husking 2 0 per cwt.

• In cherry on gross weight before husking 3 6 ..

Liberian in parchment on gross weight before husking 4 0 ..

Liberian in cherry on gross weight before husking 5 6 ..

No discount, plus War Increase 55 per cent

Hand picking, if required, charged according to labour.

Weight Notes for sale purposes 3d. each, plus War Increase 55 per cent,

Warrant Stamps 3d. each net.

Rent, if incurred after above 6 weeks, at 6d. per ton per week, less 12½ per cent discount, plus War Increase 47½ per cent.

Port of London Rates, 10d. per ton net.

THE LONDON COFFEE AUCTIONS.—The London Coffee Auctions are held twice weekly, at present on Tuesdays and Thursdays, at the Commercial Sale Rooms, Mincing Lane, E.C. Brokerage is $\frac{1}{2}$ per cent for buying and 1 per cent for selling. Bids rise by 6d. per cwt. There is a discount of 1 per cent for payment cash against warrants on the Prompt Day (notified at the top of each catalogue), which is always not later than one month after the purchase date. Warrants weights are taken for invoicing goods, and there is a customary draft allowance of 2 lb. per bag. The full terms and conditions applying to the sale of coffee are as follows :—

TERMS AND CONDITIONS OF SALE OF COFFEE

1. The Selling Brokers may at their discretion refuse to recognise the bid, or to accept the name of anyone desiring to purchase at this Sale.

2. Subject to the previous Condition, the highest bidder to be the purchaser, but the Vendor reserves the right to bid by himself or his agent, or to alter, vary, or withdraw any lot or lots before or during the Sale. Should any dispute arise during the course of bidding at the Sale the same shall be decided by the showing of hands, or be left to the decision of the Selling Broker.

3. Brokers or agents purchasing at this Sale must declare their Principals (to be approved by the Selling Brokers) immediately after the Sale, or be held responsible for the fulfilment of the Contract.

4. Prompt as printed ; payment for the Coffee to be made as follows : A deposit to be paid to the Selling Broker on the Tuesday following the day of Sale on all purchases for which the weight notes have been delivered to the Buyer on or before the preceding Friday. The deposit to be 20 per cent on the selling price of Coffee, the same to be reckoned in even poundage, and the balance by cash on the Prompt Day or on delivery of the warrants ; Interest at the rate of 5 per cent per annum being allowed on all payments made before the Prompt for the unexpired term.

5. For all Coffees (excepting those sold on quay terms) one warrant and one weight note to be made out for each lot.

6. For all Coffees sold on quay terms, one warrant and one weight note to be made out for each lot, but if the lot exceeds 40 bags, Buyer to have the option of separate warrants and weight notes for each 40 bags. The delivery of the warrants (or other documents of title to the Coffee) by Selling Brokers to the Buyer on payment of the purchase money shall be deemed to be delivery of the Coffee to the Buyer.

7. The goods to be ready for delivery on the morning after the day of Sale ; the Buyer to have the option of cancelling his purchase of any lot or lots for which he cannot obtain the warrants and weight notes on the second morning after the day of Sale, an immediate written declaration that the contract is rescinded to be given to the Selling Brokers.

8. The goods to be taken at warrant weights, with customary allowances, as they lie in the warehouse (the damaged portion with all faults) where they may be inspected previous to the Sale ; any objection as to quality or description will not be admitted or entertained unless made within ten days of the day of Sale.

9. In case of loss from fire and/or acts and operations of war previous to Prompt Day, delivery of warrants, or day of payment, whichever may first happen, the Contract for such portion of the goods to be void, and the deposit to be returned, plus interest.

10. Lot money 6d. per lot of the value of £5 or over on all purchases within the Prompt.

11. In the event of non-fulfilment of any of the conditions, the goods to be re-sold by public or private Sale, and the loss (if any) as well as all charges incurred, to be made good by the defaulter.

12. Any dispute arising out of a Contract made under these Conditions is to be settled by Arbitration in the usual manner by London Coffee Brokers who are Members of the Coffee Trade Association of London. Such submission to Arbitration shall be final, and may be made a Rule of His Majesty's High Court of Justice, or any division thereof on the application of either party.

13. The "usual manner" referred to in the previous paragraph shall be constituted as follows :—

Each disputant shall appoint (in writing) as Arbitrator a recognised Coffee Broker and Member of the Association. No Broker shall act as Arbitrator in a case where he is interested in the subject matter of dispute without the consent (in writing) of the parties to the dispute.

If one disputant shall neglect to appoint an Arbitrator within fourteen days after notice in writing received from the other disputant of the appointment made by him, the Chairman of the Association shall appoint the other Arbitrator. A fee of £1 is. in respect of such appointment to be paid to the Association by the party to the dispute who shall apply for such appointment to be made.

Such Arbitrators shall, before entering on the Arbitration, appoint an Umpire (also a Coffee Broker and Member of this Association) and in the event of the Arbitrators being unable to agree upon an award they shall refer the dispute to the Umpire. If the Arbitrators shall neglect to appoint an Umpire within seven days from their appointment, the Chairman of the Association (at the request of either Arbitrator) shall appoint same.

The Arbitrators and Umpire shall have power to obtain, call for, receive and act upon any such oral or documentary evidence or information (whether the same be strictly admissible as evidence or not) and to conduct the Arbitration in such manner in all respects as they or he may think fit.

The award of such Arbitrators or Umpire (as the case may be) shall be final and binding on all parties.

All awards must be signed by the Arbitrators or Umpire in their own names.

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CHAPTER IX

GEOGRAPHICAL SURVEY : COFFEE PRODUCTION

COFFEE PRODUCTION IN INDIA, CEYLON, BRITISH MALAYA, EAST AND CENTRAL AFRICA, SIERRA LEONE, JAMAICA, BRITISH GUIANA AND AUSTRALIA

[Revised to January, 1924 ; annual statistics complete to December 31st, 1922.]

India : Historical and General. Acreage under Coffee. Production and Yield per Acre. Handling and Curing the Coffee Crops. Ceylon. British Malaya. Kenya : Acreage under Coffee. Exports. Labour. Tanganyika. Uganda : Exports. Acreage under Coffee. Coffee Districts. Yields. Cost of Planting Up. Cost of Production. Nyasaland. Sierra Leone. The Cameroons. Aden. Jamaica : Exports. Freight Rates. British Guiana. Australia.

1. COFFEE IN INDIA

HISTORICAL AND GENERAL.—The systematic cultivation of coffee in India dates from 1830. During the next thirty years a large area was put under coffee in Mysore, Coorg, the Nilgiri and Shevaroy Hills, and the Wynaad. In 1862 the Coffee industry in Southern India had reached its zenith, but three years later the borer beetle made its appearance in the Wynaad and Coorg, and the leaf blight (*Hemileia vastatrix*) which had ruined the Ceylon coffee estates followed. Between 1877 and 1887 no less than 263 plantations in the Wynaad were abandoned and the Ceylon industry was completely ruined ; but the Indian industry, if it has made no headway in the last thirty or forty years, has at least lost little ground despite falling prices due to the competition of Brazil, Guatemala, and Costa Rica, chiefly because the produce is generally of superior quality. Indeed, the coffee from certain Mysore estates commands higher prices than even the so-called Mocha, much of which, if the truth were known, being native cherry exported by *dhow* from Mangalore and Tellicherry to Red Sea ports.

EXPORTS OF COFFEE FROM INDIA.—The exports of coffee from India in the calendar years 1921 and 1922 were as shown in the table on next page.

In the pre-War year, 1913-14, shipments amounted to 259,900 cwt., of which 92,353 cwt. went to the United Kingdom, 97,543 cwt. to France, 12,751 cwt. to Ceylon, 4482 cwt. to Turkey in Asia, 9122 cwt. to Belgium, 9224 cwt. to Germany, 12,133 cwt. to Austria-Hungary, and the balance to "Other Countries."

In the six months, April to September, 1923, the exports increased to

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122,500 cwt., as compared with 77,600 cwt. in the corresponding period of the previous year. All the principal importing countries took larger quantities, the most noticeable increases being France, the United Kingdom, Arabia, and the Bahrein Islands.

EXPORTS OF COFFEE FROM INDIA

	Quantity		Value	
	1921 cwt.	1922 cwt.	1921 Rs.	1922 Rs.
To United Kingdom	99,633	65,823	54,65,207	46,74,027
„ France	81,787	67,328	44,75,236	48,95,350
„ Turkey, Asiatic (incl. Mesopotamia)	19,989	4,393	11,25,440	3,25,090
„ Arabia	9,834	1,810	5,22,902	1,28,912
„ Bahrein Islands	17,530	3,961	10,41,741	2,80,157
„ Ceylon	1,490	379	82,401	28,601
„ Australia (including New Zealand)	6,949	8,839	3,80,415	6,17,680
„ Other Countries	31,267	21,210	17,90,228	15,37,639
Total	268,479	173,743	1,48,82,570	1,24,87,456

PRODUCTION AND YIELD OF COFFEE PER ACRE IN INDIA.—The following figures are furnished by the Director-General of Commercial Intelligence for India regarding the total production in the years ending 31st March, and yield per acre of coffee in the various planting districts; they are stated, however, to exclude the production of plantations of under ten acres in extent :—

PRODUCTION OF COFFEE IN INDIA AND YIELD PER ACRE

	1920-21	1921-22	1922-23
No. of Plantations reporting	2942	2964	2998
	cwt.	cwt.	cwt.
Total production	200,774	184,309	227,390
Average yield per acre of plucked area -	lb.	lb.	lb.
For Madras	210	202	296
„ Coorg	235	182	251
„ Mysore	189	179	177
„ Cochin	132	128	126
„ Travancore	246	117	149

These yields are, of course, very low owing to deterioration of old plantations.

Doubt is even cast (by the United Planters' Association of South India) on the apparent improvement in yields in Madras Presidency and Coorg during 1922-23, the accuracy of the statistics being challenged. Four hundred pounds of clean coffee per acre used to be taken as a fair average—but not a good—yield.

IMPROVED CULTIVATION.—Happily during recent years increased attention has been directed to the scientific cultivation of the crop. The coffee on many

of the estates is very old and will shortly have to be replaced. An important change has already taken place in the substitution of the hardy and robust Coorg strain for the old "Chick" coffee. It has lately been realised that there is a need for better seed selection, and for studying the possibility of raising a new vigorous strain of coffee by hybridisation on Mendelian lines. The matter has been taken up by some of the more experienced planters, and great promise of success has been achieved with two new types of plant which have been evolved. Of these, one called "Jackson's" coffee hybrid, and another Kent's Arabica, have given the best results and have continued to be popular. The seeds of both forms have been exported in considerable quantity to the Kenya Colony for planting there. The hybrid gives good crops, while Kent's Arabica has shown itself as a most vigorous disease resister, and one capable of being grown upon land where the ordinary types fail to produce a yield.

Most of the coffee grown in Southern India is of the Arabian variety, but some Robusta has been planted recently.

ACREAGE UNDER COFFEE IN SOUTH INDIA.—The official figures of acreage under coffee in South India (excluding plantations of under ten acres) have, like the figures of yield per acre, been called into question by the U.P.A.S.I. They show a total area under coffee at the close of the year 1922-23 of 131,655 acres, of which Mysore accounts for 52 per cent, Coorg for 24 per cent, Madras for 22 per cent, and Cochin and Travancore together for 2 per cent. New land is said to have been planted up with coffee to the extent of 7224 acres in 1922-23, while 2842 acres of old cultivation were abandoned, the net increase being 4382 acres over 1921-22. The area plucked in 1922-23, according to the same authority, was 114,496 acres. A considerable proportion of the new area stated to have been planted was in the Madras Presidency, but the United Planters' Association of South India have been unable to trace any increase such as reported.

HANDLING AND CURING THE INDIAN COFFEE CROPS.—After plucking, the fruit is either dried and pounded or immersed in water and pulped by the wet method before it is bagged and sent down to the coast. Some coffee is sent in parchment direct to Europe, but the bulk of the coffee grown in Mysore, Coorg, and the Wynaad, the Nilgiris, Palni and Shevaroy Hills is prepared for export at Mangalore, Tellicherry, Calicut, and Coimbatore, where there are a large number of big curing works, each employing about two hundred men and women. The parchment coffee which is brought down to the coast in carts is spread out on barbecues, consisting of asphalt platforms in open yards slightly sloped from the centre and divided by low slanting barriers. When sun-dried the coffee is taken into the peelers, and after peeling, winnowed by either machinery or hand labour, and sized. It is then garbled by women, who eliminate all the broken and imperfect beans. When the garbling is over the coffee is weighed and then bagged in double sacks or put into casks. Commercially two kinds of coffee are recognised: (1) *cherry*, usually from Indian-owned estates, where the whole fruit is dried and not put through pulpers, and (2) *plantation coffee*, cured at the coast ports according to the process already described. Most of the cherry goes to France, and of the plantation coffee

to the United Kingdom. The three recognised sizes are known as A, B, and C, exclusive of peaberry, while the broken and imperfect beans are classified as *triage*. When bagged, coffee is put up in gunnies containing 182 lb. net, and shipment is usually effected between December and March but may be extended to May.

LABOUR.—The statistics for labour employed on coffee plantations in South India during 1922-23 show a daily average of 67,903 persons, of whom 41,717 were permanent and 26,186 temporary employes. The estates from which this information was gathered plucked 114,496 acres during 1922-23.

2. COFFEE IN CEYLON

Arabian coffee was the first staple product of Ceylon, and at its highest point of prosperity, about 1870, there were 185,000 acres in the island under this cultivation, representing a capital value of perhaps £5,500,000 to £7,000,000, while the exports amounted to 1,000,000 cwt. in good years. Then in the early 'seventies came the leaf disease (*Hemeleia vastatrix*) which spread with alarming rapidity, devastating the whole industry and ruining many planters. The export from Ceylon consequently dropped from nearly 1,000,000 cwt. in 1974 to 187 cwt. in the pre-War year (1913).

There are no cultivations of Arabian coffee now remaining in the Colony, although there are still considerable numbers of trees to be found scattered in all the planting districts. These trees thrive and produce good crops when they are under shade, and locally grown Arabian coffee can be purchased in most stores and boutiques. In recent years, as the result of experiments at experiment stations, there has been some planting of the Robusta type of coffee, and good crops are now being obtained from Robusta coffee and from a hybrid type. The demand for seeds and plants from the areas grown in the experiment stations exceeds the supply, and it is possible that fair areas may be under Robusta types of coffee in the near future. The plants grow well, suffer but little from the leaf disease, and yield in favourable localities satisfactory crops. Exports in 1922 amounted to 565 cwt.

3. COFFEE IN BRITISH MALAYA

According to a recent return of agricultural acreages there are in the whole of British Malaya only some 7910 acres under coffee. This is divided into 922 acres under coffee alone (all in the Federated Malay States); 3965 acres of coffee interplanted with rubber (1299 of which were in the Federated Malay States and 2666 in Kelantan, Kedah, and Trengganu—much of this must now be dying out, if not already cut out); 862 acres coffee under coco-nuts (702 in the Federated Malay States and 160 in the Straits Settlements) and 2161 acres coffee interplanted with other crops, of which 2001 are in the Federated Malay States and 166 in the Straits Settlements. Taking British Malaya as a whole

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there is no surplus of exports over imports, the reverse being the case. Such coffee of local production as is exported from the Federated Malay States and Unfederated Malay States goes to the Straits Settlements, where it either enters into consumption or loses its identity in the much larger import/export trade of that Colony. The retention of the Federated Malay States in the general table on page 198 is, however, a reminder of the glories of the past, when the country was a really large producer for export. It will be observed that even in 1913 the shipments still reached 14,850 cwt.; ten years earlier, in 1903, they were 75,720 cwt., but the rubber industry has carried all before it and swept the coffee plantations, which were already past their prime, into oblivion.

It may be interesting to quote the imports and exports of coffee from British Malaya in recent years :—

	1921	1922
Imports . . .	149,860 piculs \$2,797,504	174,779 piculs \$4,574,928
Exports . . .	113,405 piculs \$2,287,970	144,408 piculs \$3,774,205

4. COFFEE IN EAST AND CENTRAL AFRICA

UGANDA, KENYA, TANGANYIKA, NYASALAND

The coffee-producing countries among British Possessions in Africa are Uganda, Kenya, and Nyasaland; while Tanganyika, though a mandated territory, may also be briefly considered. Inasmuch as returns of exports have not been kept separately for Uganda and Kenya, there is some little difficulty in arriving at accurate figures in respect of exports of coffee as between the two countries. Imports, via Kisumu, i.e. Uganda produce, may be kept some considerable time at the port before shipment. Consequently the following division, though official, of the exports of the four countries is offered subject to the above reserve in respect of two of them.

EXPORTS OF COFFEE

	cwt.	£
Kenya (1921)	99,187	379,698
Uganda (1921)	48,856	94,038
Tanganyika (1922)	85,420	203,000
Nyasaland (1922)	849	

The following is a detailed statement showing the quantity and value of coffee exported from the Colony and Protectorate of Kenya and Uganda Protectorate during the year ended 31st December, 1922 :—

EXPORTS OF COFFEE FROM KENYA AND UGANDA

Destination.	Domestic Produce.	Produce of the Tanganyika Territory.	Total.	Domestic Produce.	Produce of the Tanganyika Territory.	Total.
	cwt.	cwt.	cwt.	£	£	£
To United Kingdom	88,240	8,431	96,671	267,157	20,308	287,465
„ India and Burma	5,004	5,030	10,034	12,232	10,907	23,139
„ Egypt	6,329	23,454	29,783	16,769	50,292	67,001
„ Zanzibar	699	1,583	2,282	1,862	3,459	5,341
„ Union of South Africa	9,857	464	10,321	30,895	961	31,856
„ Tanganyika Territory	—	434	434	—	995	995
„ Other British Possessions	10	169	179	27	399	426
„ Arabia	558	112	670	1,222	126	1,348
„ Belgian Congo	64	—	64	87	—	87
„ Belgium	26	530	556	58	1,626	1,684
„ Denmark	1	—	1	6	—	6
„ France	5,981	13,390	19,371	17,535	30,219	47,754
„ Germany	520	89	609	1,167	300	1,467
„ Greece	—	—	—	—	1	1
„ Holland	2,072	8,768	10,840	5,988	20,822	26,810
„ Italian East Africa	6,897	7,660	14,557	16,027	19,241	35,268
„ Italy	1,057	1,619	2,676	2,434	3,669	6,103
„ Norway	542	—	542	1,925	—	1,925
„ Portuguese Possessions	1,401	1,376	2,777	3,722	2,603	6,325
„ United States of America	3	—	3	8	—	8
Total	129,261	73,109	202,370	379,061	165,928	544,989

The above figure (for domestic exports) of 129,261 cwt., valued at £379,061, represents 14 per cent of the total exports from Kenya and Uganda. Unfortunately, to add to the complication of reviewing the trade figures of this part of the Empire, there has been a change in the financial year; the only recent figures for comparison, therefore, are 1921 (nine months ended December 31st), 81,543 cwt. domestic exports, value £263,105; and 1920-21 (twelve months ended 31st March) 158,267 cwt., value £574,884. The average value per cwt. in recent periods has been: 1918-19 (47s. 0.5d.), 1919-20 (69s. 2.7d.), 1920-21 (72s. 7.8d.), 1921 (nine months: 64s. 6.4d.), 1922 (58s. 7.8d.).

COFFEE IN KENYA

The cultivation of Arabica coffee has extended rapidly since it was introduced into Kenya some twenty-five years ago, and it has become the staple crop of the highlands. Leaves are produced throughout the year, so that there is no withering period.

KENYA ACREAGE UNDER COFFEE.—From statistical information obtained as

at the 30th June, 1922, the total area planted was 43,359 acres, of which there were from

	Acres
1 to 3 years of age . . .	20,137
3 to 6 " " . . .	9,474
6 years and over . . .	13,748
Total . . .	43,359

This figure shows an increase of 9,546 acres over the previous year's statistical return, and further areas planted since the date of the 1922 return brought the planted area at 30th June, 1923, up to 52,249 acres—a further increase of 8,890 acres. Much young coffee being on the point of coming into bearing, it would appear probable that the export of Kenya coffee from European-owned estates will be trebled within the next four or five years. The estimated crop for 1923-24 is 122,885 cwt., against 98,357 cwt. for 1922-23.

Rust caused by the fungus *Hemileia vastatrix* is the most important disease, but the severity of its attack is greatly influenced by humidity and temperature, and to a less degree by management. The first attack on a plantation is always the most injurious, but there is no complete defoliation. In view of the past record of this disease in Ceylon, its appearance in Kenya Colony is viewed with considerable apprehension, but it really seems that the attacks are less severe than those experienced in Ceylon in the early 'eighties.

In Kenya Colony coffee cultivation is usually unprofitable below 4000 feet, as a high temperature and high humidity in the rainy seasons are so favourable to the rust that spraying is of no avail. At 6000 to 7000 feet, with a rainfall of 60-70 inches and an atmosphere saturated in the mornings, the low temperature checks the spread of rust, and is readily controlled by weak fungicides. At altitudes of 4000 to 5000 feet it is necessary to spray regularly with a stronger mixture.

In the year ending June 30th, 1920, the Department of Agriculture found—from statistical information furnished—the following to be the average yields per acre :

	Per acre
1 to 3 years of age . . .	$\frac{1}{2}$ cwt.
3 to 6 " " . . .	2.86
6 years and over . . .	6.66

The coffee is graded into four qualities, an average crop yielding 20 per cent A quality; 50-60 per cent B quality; 28-18 per cent C; and 2 per cent peaberry.

COFFEE EXPORTS FROM KENYA.—As noted above, there is considerable difficulty in allocating exports according to source. A feature to be noticed is the attempts which are being made to open up new markets. South Africa, the Continent and neighbouring countries already take a fair amount of varying grades, and efforts are now being directed upon direct shipments to Australia and the United States of America. Recently the Colony received a delegation from South Africa to investigate and report on reciprocal trade relationships

between Kenya and the Union of South Africa ; as a result it is proposed to grant a rebate of two-thirds of the South African Customs Duty on both the Kenya and Uganda coffees. Already coffee forms the bulk of Kenya's exports to the Union, although it only constitutes about 5 per cent. of the Union's total importations of raw coffee, which in 1921 approximated 15,000 short tons per annum, of which 14,000 emanated from Brazil, Kenya and Uganda taking second place with 700 tons, and Dutch East Indies third with 150 tons.

Nairobi coffee, being of exceptionally fine quality, and fetching on the London market up to 116s. per cwt., has been used in South Africa mainly for blending purposes in the mixtures put up, roasted and ground ready for use. But a large body of consumers in the Union prefer to buy the coffee berry, and the sale of Nairobi coffee for this purpose is expanding, now that its qualities are beginning to be appreciated. In the past, so it was stated, South African buyers were offering only 70s. per cwt., although the average price realised was 85s. per cwt. c.i.f. London, equivalent to 81s. f.o.b. Mombasa, Kenya. Shippers are desirous of instituting a system of sale by grades to South African merchants similar to that in vogue on the London market. They are prepared to send down representative ranges of samples, and the advantages of the system are so obvious as to need no recommendation.

The less expensive grades from Uganda have an excellent chance of competing with the Rio coffee, and should find a ready sale.

The foregoing arrangement has been noted at some length as it is a happy example of the kind of reciprocity which can be entered into with beneficial results between countries of the Empire, and to show the opportunity for which is one of the reasons for the publication of the series of which this volume forms part.

The coffee that reached the London market from Kenya during the early part of 1922 was, with few exceptions, far below the average of Nairobi coffee. This was due to the drought which occurred in 1921. Much disappointment was evinced by the buyers at the quality of the crop, but judging by the high prices realised for the succeeding crop this feeling of disappointment must have passed away.

Much Nairobi coffee is locally cleaned before export. During 1923 an interesting experiment was carried out by Messrs. Durant Radford & Co., on account of Thembigwa Ltd., owners of one of the finest coffee estates in Kenya. Two parcels of the season's coffee, from the same estate, one locally cleaned and the other London cleaned were submitted for sale at the same time.

The prices realised per cwt. were :—

	London cleaned.	Locally cleaned.		London cleaned.	Locally cleaned.
Peaberry .	118/-	82/- and 101/-	Very small .	78/6	—
Bold .	112/-	107/6	Triage .	66/-	77/-
Medium .	97/6	96/6	Broken .	76/-	—
Small .	90/6	86/6	Overgrown .	—	85/-

A report on the London cleaned coffee states :—

"The coffee turned out good, greenish, bright and fresh, showing it was well prepared and dried. It was an attractive coffee in appearance, roasted and liquored well and the home trade competed briskly for the whole parcel. As a matter of fact the prices secured for the bold, medium and small sizes were the highest paid in the day's sale, and as regards

the peaberry, sh. 118s. per cwt. was the highest price that has been paid for Nairobi coffee since the new crop came into the market."

Of the locally cleaned coffee it is remarked: "The coffee was greenish but rather dull when compared with the London cleaned parcel. It had been well prepared and graded, gave good roast and was good in the cup."

The Coffee Planters' Union of Kenya (Standard Buildings, 6th Avenue, Nairobi) carries on a useful work.

LABOUR.—Labour for harvesting the coffee crop is provided by the Waki-kuyu, but unfortunately the industry in recent years has been confronted by a scarcity of labour in the months when it is most required for dealing with the crops and a comparative plenitude at other times, particularly during the period immediately preceding the time of collection of the native poll-tax. Since it is the necessity of working to accumulate money to pay the tax that makes the native labour unusually plentiful just at the season when it is not required, a case exists for changing the period of collection of tax in the coffee districts to a time just after the normal ingathering of the coffee crop.

COFFEE IN TANGANYIKA

There is a small number of European-owned coffee estates on the slopes of Kilimanjaro in Tanganyika territory and on the western and south-western shores of Lake Victoria there is a considerable quantity grown by natives. Native-grown coffee is exported from Bukoba, and comparative statistics are of interest. In 1923, 403 tons worth £20,112 were exported. By 1917 these figures had risen to 1228 tons and £32,569 respectively, while in 1922 the export increased to 2740 tons valued at £113,381. The 1923 crop was expected to exceed 3000 tons. In the Moshi district the prospects of coffee cultivation on a large scale by the Wachagga are most encouraging. This tribe started plantations of coffee as early as 1907, but in a small way, and, according to the last German figures, only 14,000 trees were native owned. At a recent census 178,000 trees were counted. In order to provide seed of good quality a Government grant was made and nurseries started, from which 100,000 seedlings will shortly be ready for planting out. The quality of the coffee is in some cases quite equal to that grown by Europeans, and the price paid for it by local merchants has averaged one shilling per kilo. A voluntary inspection scheme was recently instituted by merchants in this area to assist the natives in raising and maintaining standards. If the cultivation extends, difficulties may be encountered in the processes of drying and hulling, but these operations will probably be performed by Europeans, the native's share in the industry being limited to cultivation, collection and pulping.

COFFEE IN UGANDA

The indigenous coffee of Uganda is *Coffea robusta*. It occurs throughout the Buganda Province in small lots of a few trees, which receive practically no attention beyond picking the fruit when ripe. Recently *Coffea arabica*, from Nyasaland and Bourbon have been introduced and largely planted up, and coffee is at present the staple crop of European planters in Uganda.

216 RUBBER, TEA, COFFEE AND SPICES

Besides the indigenous coffee, natives have planted *Coffea arabica* to a large extent, and hundreds of small patches are to be found 'scattered throughout Uganda. The yields and prices of coffee have proved a disappointment to natives, so that many of their plantations are sadly neglected, and in many cases cultivation has entirely stopped. In the more humid parts of Uganda the life of Arabian coffee is very short, so that the indigenous *Coffea robusta* will probably be more largely cultivated in the future.

EXPORTS.—The exports of coffee from Uganda amounted to 12,252 cwt. (value £23,167) in 1913-14, 48,256 cwt. in 1921, and 51,262 cwt. (value £99,227) in 1922. As it is shipped through Kenya, the distribution is perforce shown in a combined amount with Kenya coffee on page 212. Until about 1916 a large proportion of the output was shipped in parchment, but the bulk of exports are now hulled before shipment.

ACREAGE UNDER COFFEE IN UGANDA.—An official report, giving the acreage under coffee in Uganda at the end of 1922, shows a total of 41,187 acres made up as follows :—

17,656	acres	coffee	growing	alone	(European	estates).
3,044	"	"	"	"	(Indian	estates).
8,894	acres	of	coffee	interplanted	with	rubber (European
895	"	"	"	"	"	(Indian
10,698	acres	of	native	grown	coffee.	
<hr/>						
41,187						

Of the 20,700 acres stated to be under coffee growing alone, 20,245 acres are Arabica and the rest Robusta coffee, and 2027 acres were under 2 years of age (read now under 3 years), and 18,673 acres were over 2 years (now over 3 years). Similar data are not available regarding interplanted and native-grown coffee, and it is highly probable that most of the 9789 acres of interplanted coffee has now been so far shaded out as to be of little value for productive purposes. Mr. C. H. Lankester, who recently made an investigation of the industry for the Department of Agriculture (Kampala), came to the conclusion that the native coffee counted for very little, and that large further discounts should, for various reasons, be made from the figures, bringing the total down to about 15,000 acres of good coffee.

COFFEE DISTRICTS.—A coffee expert from Costa Rica, who was employed by the Uganda Government to report on the industry, recently ranged the coffee-producing areas in order of physical superiority thus: (1) Toro, (2) Elgon, (3) Mubendi, (4) Mityana and Masindi equal, (5) Kiagwe, (6) Entebbe and Busoga. Masaka district was not visited, but reports from other sources indicate it to be favourable to coffee planting. The present outlook of Toro is restricted by the heavy transport charge of £20 per ton to a lake port, and until this is reduced to a reasonable figure the planter is denied benefit from the many undoubted advantages conveyed by rich soils, favourable climate, and adequate and good water supply. If labour can be obtained, unlimited land of excellent quality awaits development. Average yields of 6 to 7 cwt. dry coffee per acre are claimed. The western foothills of Elgon, with their teeming Bagishu

population, offer a favourable opportunity for a wide increase of an industry already established, and the district eastwards from Mbale contains much good coffee land. Mubendi, though not as a district so prodigal in suitable sites as Toro, has areas of the most fertile soil, which are not likely to be confined to those already in favourable exploitation. Here, again, the hundred odd miles of necessary road transport is a very heavy charge. Mityana, only fifty miles or so from Kampala, is rather variable in the quality of soil available, but contains some notably fertile areas in spite of an apparently dry climate; it is mainly a "savanna" region. Coffee of very fine growth, of a vigour and general appearance not excelled in the Protectorate, may be seen here. Masindi (including Hoima) is as a group of plantations the best in the Protectorate. Culture and preparation are both well carried out, and facilities for the latter have been provided with greater thoroughness. Possibility of export by the alternative routes of the Nile or Kisumu is an undoubted advantage, the benefits of which will become greater when the Nile is rendered a cheaper means of transport.

Hemileia vastatrix, the leaf fungus with so terrible a reputation from the East, appeared in Uganda in epidemic form in 1913, and caused a loss of crop that year estimated at as much as 30 per cent. Fear of results similar to those which occurred in Ceylon caused many planters to turn their attention to other crops, and probably some percentage of the rubber estates derived their existence from this apprehension. This disease has, however, never proved so disastrous in its effects as in Ceylon, but that it modifies output is only too probable.

YIELDS.—Owing to the very large area of coffee interplanted with Para rubber, satisfactory figures for yield per acre are not forthcoming. The good crop of cherry borne by the trees evidenced the very high percentage of loss caused by insect, fungoid, or climatic influences, and until these are checked or modified little hope can be entertained of improvement.

COST OF PLANTING UP.—The following is an estimate of the cost of planting and bringing to production in Uganda supplied from an official source :—

FIRST YEAR		Fls.
Lease of Land, 320 acres, at Fls. 2s. per acre per annum	.	640.00
Survey, Legal Fees, etc.	.	1,000.00
Clearing and Planting 200 acres	.	3,000.00
Seeds and Nurseries	.	500.00
Manager's Bungalow (wattle and daub)	.	1,000.00
Tool Store	.	100.00
Manager's Salary	.	3,600.00
Tools	.	750.00
Incidentals	.	500.00
Depreciation	.	Nil
Weeding	.	5,000.00
Total Fls.		16,090.00
Add interest on capital, 10 per cent	.	1,609.00
Total		17,699.00

SECOND YEAR		Fls.
Rent		640.00
Upkeep, Weeding, Pruning, etc.		4,800.00
Seeds and Nurseries		150.00
Supplying		200.00
Incidentals		500.00
Tools		250.00
Manager's Salary		3,850.00
Depreciation on tools 33 per cent, on buildings 20 per cent		470.00
Total Fls.		10,860.00
Add interest on capital, 10 per cent		1,086.00
Total		11,946.00

THIRD YEAR		
Rent		640.00
Weeding, Pruning, Upkeep, etc.		4,800.00
Incidentals		500.00
Manager's Salary		4,100.00
Tools		250.00
Two hundred Coffee Trays		1,400.00
Hand Coffee Pulper, Pulping Shed, Tanks, Piping, etc		1,500.00
Coffee Store		1,000.00
Depreciation		470.00
Total		14,660.00
Add interest on capital, 10 per cent		1,466.00
		16,126.00
Grand Total		45,771.00

The total works out at Fls. 228/85 = £23 per acre.

COST OF PRODUCTION.—The cost of production and shipping 1 cwt. of coffee, on a well-managed estate under European supervision, is given below :—

	Fls.
General Charges	7.36
Picking	2.22
Curing and Packing . . . . .	.73
Local Transport	1.04
Pruning . . . . .	.70
Pests and Diseases . . . . .	.20
Supplying . . . . .	.01
Transport	3.04
Weeding	3.78
Consumable Stores . . . . .	.80

	19.88
Freight to London	4.52
	24.40

This equals £49 per ton in London. Other estates in the Lake region show variations of from £40 to £50 per ton. Production costs of coffee vary with the quantity of crop, especially as affecting the incidence of overhead charges, so that alleviation of these may be hoped for from properly controlled native cultivation. In this connection, the interesting suggestion is made (*vide* Circular No. 7 of the Department of Agriculture, Kampala) that alleviation of the high overhead charge may be attainable by encouraging the cultivation of coffee by natives in the immediate vicinity of estates. The suggestion is that, if each plantation were able to purchase as much again as it produced, this would enable the necessary equipment to be installed, and would reduce overhead and curing expense. The successful development of the cotton industry on these lines points, it is thought, to the probability of coffee eventually following them, and it is considered doubtful, taking into consideration the present trend in Uganda and the increasing difficulties of securing adequate labour and picking force, if any great extension of coffee culture will be possible or profitable otherwise. Railway freights can be reduced only by large increases of exports. "Estimating an increase of 50 per cent over the present area of European-owned and supervised coffee estates, by eventual organisation of all labour sources further augmentation would be through controlled native cultivations." This view is particularly interesting as it is diametrically opposed to that held in Kenya regarding the balance of advantage and disadvantage in encouraging native cultivation of coffee.

As already noted, the difficulty of obtaining a sufficient supply of labour at present limits the size of a planting enterprise to about 200 acres, an area hardly sufficient to support a paid manager and at the same time to pay steady dividends to the owner. Hence the future would appear to lie with the owner-managed estate. The majority of plantations which have closed down have been absentee-landlord estates with proportionately high overhead charges.

COFFEE IN NYASALAND

Coffee was the first crop to be cultivated by Europeans in Nyasaland, and in the early years the prospects of this industry appeared so bright that the coffee plant was adopted for the armorial bearings of Nyasaland. The high-water mark of cultivation was reached in 1901, when nearly 17,000 acres were under coffee. In 1900, some 19,180 cwt. was exported. Serious crop failures, coupled with a decline in the price of coffee, led to its cultivation being abandoned to a great extent. Sufficient is still grown to meet local requirements, and it is of excellent quality. In 1922, 849 cwt. was exported, as against 807 cwt. in the previous year and 1715 cwts. in 1913. Coffee planting is, however, a very speculative business in Nyasaland, owing to the irregularity of the setting in of the rains. With little rain in October or November, the crop is always a relative failure. It succeeds, however, in very wet seasons, and for this reason is useful as a secondary crop in suitable localities with a light soil.

6. COFFEE IN BRITISH WEST AFRICA; SIERRA LEONE

There are two species of coffee commonly grown in Sierra Leone. The kind grown principally in the mountain villages yields a black berry and is *Coffea stenophylla*; the coffee which is grown principally on the low-lands, and affords a very large berry, is the Liberian coffee or *Coffea liberica*. Of the two the former produces the better quality of coffee.

Coffee cultivation has, however, been neglected of late years owing to the low prices offered. The trees receive very little attention, and in many cases are sadly neglected and practically abandoned. "Mistletoe" is allowed to grow on the tree without restriction, and many of the trees are unfruitful because of the attacks of a fungus disease. This fungus is peculiar in that it seems to confine its attacks at first to individual branches, and attacked branches can be readily recognised by their diminutive foliage. In course of time, however, it spreads until the whole tree is attacked and becomes unproductive. The only remedy then is to cut the tree hard back and allow the new branches to grow up, but it would probably be a better policy to plant young seedlings, especially if the tree be an old one. Owing to the peculiar mode of attack the disease could be controlled to a great extent by the prompt removal and burning of infected branches. There is no doubt that much more coffee might be grown and produced for export.

The present position is that imports of coffee from Liberia sometimes exceed exports, and for some years past there have been no shipments worth mentioning. The coffee is prepared by drying in the cherry and then hulling by native methods.

THE CAMEROONS

It will be sufficient only to mention the existence of a coffee growing industry in the British sphere in the Cameroons and to give the figures of exports (532 cwt., value £1349 in 1922, against 4 cwt., value £23 in 1921). All shipments were made to the United Kingdom.

7. THE COFFEE TRADE OF ADEN

Aden is the great receiving and shipping centre for the coffee trade of the Arabian Gulf and the hinterland. It possesses an open-air coffee market where camels unload from the interior. This is not frequented by the European merchants (agents of importing houses), who are represented by native brokers through whom all business is done.

Mocha coffee is grown in a small area in the mountainous regions of the south-western portion of the Arabian Peninsula in the province of Yemen. It has often been stated that the production of Mocha coffee and the area of land under cultivation are steadily decreasing. It is true that if greater care were taken of the land and in methods of cultivation, production and quality could be greatly improved. In many cases the only attention the growers give to their land and trees is to harvest as large a crop as possible. The receipts at Aden and shipments from that place have been as follows :—

TEA, CACAO AND COFFEE

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IMPORTS

From	Year ended 31-3-14.		Year ended 31-3-22.	
	cwt.	£	cwt.	Rs.
Zanzibar and Pemba	—	—	19,139	6,35,205
Somaliland	1,721 $\frac{1}{2}$	5,296	115	7,109
Straits Settlements	3,301 $\frac{3}{4}$	4,074	1,013	33,900
Perim	—	—	68	2,720
India—Bombay	1,334	773	2,333	84,120
Ceylon	101	79	90	3,600
Malabar Coast	848 $\frac{1}{4}$	850	—	—
Other British Possessions	11	31	—	—
Total British Empire	7,320 $\frac{1}{2}$	12,588	22,758	7,66,654
Mossawah (Abyssinia)	408	1,429	201	7,620
Gaizan	—	—	108	5,400
Hodeidah	50,619 $\frac{1}{2}$	167,368	43,353	21,55,768
Mocha	13,853 $\frac{1}{2}$	42,807	23,281	10,47,988
Arabian Gulf Ports	700 $\frac{3}{4}$	1,664	159	7,420
France	—	—	786	20,000
D'Jibouti and Obokh	54,204	175,858	30,992	14,37,003
Duhkali Coast	113	307	—	—
Islands of Farsan	95	272	—	—
Java	211	338	—	—
Other Foreign Countries	18	470	28	1,200
Total Foreign Countries	120,222 $\frac{3}{4}$	390,090	98,908	46,82,399

EXPORTS

To	1913-14		1921-22	
	cwt.	£	cwt.	Rs.
Australia	1,985	8,264	1,042	74,180
Perim	268 $\frac{1}{4}$	274	—	—
United Kingdom	5,223 $\frac{3}{4}$	23,903	4,690	3,22,601
Somaliland	209	356	—	—
Zanzibar	1,329	2,250	—	—
Mauritius, etc.	1,381	3,803	—	78,150
Canada	1,329 $\frac{3}{4}$	4,740	—	14,300
Suakin	336	966	—	1,50,762
Ceylon	131 $\frac{1}{2}$	266	—	250
Seychelles	1,042	2,436	—	—
Straits Settlements	—	—	—	2,150
Bombay	389 $\frac{1}{4}$	1,450	—	2,300
Calcutta	108	460	—	12,900
Hong-Kong	—	—	—	1,500
Egypt	—	—	—	16,91,527
Gibraltar	—	—	—	5,000
New Zealand	161	627	—	—
Other British Possessions	14 $\frac{3}{4}$	59	—	1,428
Total British Empire	14,908 $\frac{1}{2}$	49,854	—	23,59,048

To	EXPORTS		1921-22	
	1913-14	1921-22	Rs.	
	cwt.	£	cwt.	
Lohia	197 $\frac{3}{4}$	202	—	—
Confidah	476	1,246	—	—
Mocha	667 $\frac{1}{2}$	674	—	—
Jeddah	103 $\frac{3}{4}$	136	2,958	1,62,500
Muskat	241 $\frac{1}{4}$	709	—	—
Austria	4,946	19,251	509	34,059
France	25,570 $\frac{1}{4}$	103,545	31,623	20,36,600
Hodeidah	711	681	—	—
Germany	4,153	17,169	332	24,250
Belgium	750 $\frac{3}{4}$	3,069	366	24,200
Holland	443 $\frac{1}{2}$	1,802	22	1,950
Italy	7,247	28,672	3,099	2,22,950
Spain	4,807	18,896	4,849	3,29,360
Turkey in Europe	114 $\frac{1}{2}$	390	—	—
Greece	36 $\frac{1}{2}$	142	—	—
Russia	1,754	7,782	—	—
Other Countries in Europe	150	585	—	—
Africa	21,345	60,435	—	—
U.S.A.	38,394	144,064	13,233	8,22,288
Arabian Gulf Ports	7,610	14,342	4,782	1,64,073
China	478 $\frac{3}{4}$	2,050	55	5,000
Kamaran and Fursan	164 $\frac{1}{4}$	135	—	—
Japan	377 $\frac{1}{2}$	1,757	292	19,640
Persia	302	816	—	—
Philippines	112 $\frac{1}{2}$	540	—	—
Tonquin, etc.	138 $\frac{1}{2}$	547	—	—
Turkey in Asia	179 $\frac{1}{4}$	636	—	—
Norway	439 $\frac{1}{2}$	1,752	8,233	5,39,400
Sweden	1,060 $\frac{1}{2}$	4,163	1,735	1,13,500
North Africa	66	253	24	1,200
Italian E. Africa	—	—	1,327	39,774
D'Jibouti	—	—	49	2,896
Persian Gulf (Turkey)	—	—	531	28,750
Switzerland	—	—	18	1,300
Denmark	—	—	5,145	3,53,009
Algeria and Tunis	—	—	125	7,500
Mossawah	—	—	7,218	2,40,251
Levant and Black Sea (Turkey)	—	—	306	21,542
Other Foreign Countries	76	62	15	567
Total Foreign Countries	124,113 $\frac{3}{4}$	437,403	86,846	51,96,559
Grand Total	139,022	487,257	127,846	75,55,607

COFFEE IN BRITISH SOMALILAND.—The exports of native-grown coffee from British Somaliland go principally to Aden, and their volume may be judged from the arrivals at that place.

8. COFFEE IN JAMAICA

The area under coffee in Jamaica is reported as 20,493 acres. Jamaica produces two distinct types of coffee, the highland and the lowland growth. Among the first-named is the celebrated Blue Mountain coffee.

Blue Mountain Jamaica is one of the oldest coffees, and commands the highest price of any coffee—sometimes over 200s. a cwt.

It is shipped in barrels and has a well-developed palish blue-green bean that makes a good appearing roast and a pleasantly aromatic cup. The bulk is sold at public sale in London, and as the supply is limited the home trade keenly competes for all that is offered.

The lowland coffee is a poorer grade, selling rather above parity with Santos, and consists largely of a mixture of different growths produced by smallholders on the plains. It is a fair-sized bean, green to yellow in the "natural" and blue-green when washed. In the cup it has a coarse flavour. It is used chiefly as a filler in blends and for roasts. This kind is not consumed in Great Britain to any extent and is an "export grade."

No little effort and capital have been spent in the last four or five years establishing new fields and resuscitating old ones in certain plantations where Blue Mountain coffee is produced. The proprietors are, however, faced by some stiff problems upon which attention is now being concentrated. On the very steep slopes, not only is there a constant shifting of the surface soil, but there is danger of landslips occurring during abnormal rains. In laying out new fields, therefore, it is being recommended to save as many trees as practicable. Even if these are not desirable shade trees they may be regularly lopped off, giving them still a root hold on the soil. This greatly reduces the risk of having landslides as the living roots hold the soil together, while the decayed roots increase the tendency to slipping. A judicious system of blind trenches is also being adopted. These provide surface mulch, break the force of the water during heavy rains, and also collect the surface soil and humus which are carried away by even average showers.

In the older fields, as a result of recurring and protracted drought, quite a number of trees have died and are dying. It is gratifying to note that, in cases where mulching has been tried, not only have fields been resuscitated, but sections in which the plant refused to grow, due to the absence of humus, are to-day flourishing fields.

The argument in the past against mulching on these high elevations was that, in rainy weather, the soil would be kept chill. To-day, some of the leading planters are convinced that, while mulching keeps the soil cool in dry weather, it also keeps it warm in wet weather with the additional advantage of adding humus.

One striking feature in the area over which Blue Mountain coffee is being produced is the denuded condition of the hills, resulting in an absence of humidity. Hitherto, Blue Mountain coffee has been grown without shade, but it seems there are arguments for reversing this practice.

COFFEE EXPORTS FROM JAMAICA

	cwt.	1921 £
To United Kingdom	5,000	12,500
„ Rest of British Empire (principally Canada)	34,228	85,569
„ U.S.A.	7,164	17,910
„ Other Countries	18,187	45,468
	64,579	161,447

[1922, 62,615 cwt., value £203,900; 1923, 68,119 cwt.]

FREIGHT RATE.—Coffee (clean) from Kingston, Jamaica, to United Kingdom, 70s. per ton weight, ditto (husk) 90s. per ton weight; 10s. per ton additional from outports.

9. COFFEE IN BRITISH GUIANA

In the early part of the nineteenth century, British Guiana exported large quantities of coffee, but from 1846 onward, until just lately, no exports of any importance have been made. About the time of the abolition of slavery the gradual abandonment of coffee cultivation took place, and at the present time the quantity grown is not greatly in excess of the local demand. The coffee grown in the County of Berbice is of very high quality.

There are large areas of low-lying lands in the Colony on which coffee grows splendidly. Many of the river lands yield good crops. Coffee often thrives on the river lands that are not well suited for the cultivation of cacao, and therefore cacao and coffee growing is often practised on the same property. The area under coffee steadily increased from about 700 acres in 1904 to 3166 acres in 1913 and 5158 acres in 1918. In 1922 the returns showed 4240 acres under cultivation, but the export was the largest for three years, viz. 7220 cwt., and second largest for the decade, comparing with only 798 cwt. in the pre-War year (1923 exports, 4778 cwt.). The reported reduction in acreage is perhaps due merely to faulty returns, since it is stated that it is known that quantities of young seedlings are being planted out, while but little, if any, coffee land has been abandoned in late years.

The Robusta and Liberian varieties are now in favour for planting, and there are reasons for believing that the returns from coffee cultivation for the next five years are likely to be more profitable than during the past decade. Large numbers of selected seedlings are sold annually by the Board of Agriculture through the Botanic Gardens, and the demand is rapidly increasing. Experiments with coffee cultivation have been carried out on the Government plantations at Onderneeming since 1904, when the old coffee fields were drastically pruned and intensive cultivation was commenced. The yields have gradually increased until now they are nearly four times what they were when the experiments were commenced.

10. COFFEE IN AUSTRALIA

Queensland is the only State of the Australian Commonwealth in which coffee growing has been at all extensively tried, and here the results have up

to the present time been far from satisfactory. The total area devoted to this crop reached its highest point in the season 1901-2, when an area of 547 acres was recorded. The area then continuously declined to 1906-7, when it was as low as 256 acres. In subsequent seasons the area fluctuated somewhat, but on the whole with a downward tendency, and in 1920-21, only 18 productive acres were recorded, with a yield of 12,120 lb. There are no exports.

CHAPTER X

TEA, CACAO AND COFFEE

FINAL SURVEY OF THE POSITION AND PROSPECTS OF THE BRITISH TEA, CACAO, AND COFFEE-GROWING INDUSTRIES

The Present Outlook for British Tea Growing. The Position and Prospects of the British Cacao Growing Industry. The Position of Coffee Growing.

THE PRESENT OUTLOOK FOR BRITISH TEA GROWING.—In the opening statement on the subject of the tea industry it was deemed desirable to go somewhat fully into the recent history of the industry for the sake of the light that it casts on the present situation. History has a way of repeating itself. At the present time the tea market is strong and prices are very high. Stocks are low and the reported increase in the tea crop is a moderate one, while consumption still shows little sign of being affected by the high prices. At first sight, therefore, there are present all the inducements which ordinarily lead to the planting up of new areas. At first sight only, however. For the first time (if an exception is made of the case of the commencement of rubber planting in Ceylon) deterrent factors are present simultaneously with high prices and high profits. Hitherto, when a check has been administered, it has been through low prices for tea. The position now is that high costs of opening land in tea and high costs of production are operating against extensions. New estates formed at the present time at a high cost for capital expenditure would have to compete with established estates having their tea acreage standing on their books at a much lower figure. Their cost of production would undoubtedly be higher in the first years of bearing. And how high existing costs of production on old and well managed estates now are may be seen from the figures which are reproduced elsewhere (pp. 146, 153). Labour supply again is restricted, and any further demand would doubtless raise its cost.

The Chairman of the Indian Tea Association, Mr. W. A. Bain, recently (Annual Meeting of the Association, 27th July, 1923) gave it as his considered opinion that the present cost of opening an acre of good Assam tea would be "at least £100 and possibly a good deal more." He pointed out at the same

time that the capital and block accounts of many existing companies showed values of £15 to £50 per acre—figures attained in some cases by substantial writing down of the items.

That there will be within the next few years an increasing demand for tea that will require to be satisfied is highly probable. The eventual return of Russia to the rank of tea-consuming nations, which she formerly occupied, is a development on which we may count, however long it be delayed, and there is a general tendency for tea consumption to increase throughout the world.

It is certain that increased planted acreage under tea will eventually be required—perhaps within the period from this date that estates planted now would take to come into bearing—but it does not appear probable that any important extensions will be carried out for a while yet. The reasons for this are : *first*, the financial and labour difficulties already mentioned, which would make it difficult for estates to compete with old ones, particularly should there be a slump in prices ; *secondly*, the consideration that the old-established companies *if they want to* and see prospects of a good return on their money, can, in the favourable state of their finances, issue capital at a premium, and so plant up their new acreage at a capital cost (as distinguished from real cash cost) per acre of one-third or half that of new competitors ; and *thirdly*, the fact that, by going back to coarse plucking, existing estates can increase their production whenever necessary to meet the requirements of demand.

In accordance with this reading of the position, there will be economic advantage to the industry as well as to the consumer if the extensions that prove necessary are made by existing plantations ; and if in the meanwhile the ability to produce more—admittedly of poorer stuff—is used as a buffer to enable demand to fill consumption.

From a purely investment point of view, indeed, the shares in some Ceylon and Indian Companies already producing and earning good profits, when obtainable at a price that shows a reasonable capitalisation per acre, present more attraction than any planting-up proposition at the present time, and so long as this is the case there must be difficulty in finding capital for new tea estates.

That the higher prices at present ruling will eventually bring about a natural reaction is to be expected, and should be welcome ; but now that old stocks have been worked off and the industry rehabilitated, there appears little doubt that the course of the British tea-growing industry is, comparatively speaking, “ set fair ” for a long time to come.

The reappearance in the market of increased quantities of China tea, and increased competition from Java and Sumatra must, of course, be expected, and these will share in any increased demand. On the other hand, judging from experience in rubber, it is highly probable that land recently planted to tea in Sumatra will prove more expensive in capital outlay than the investors anticipated.

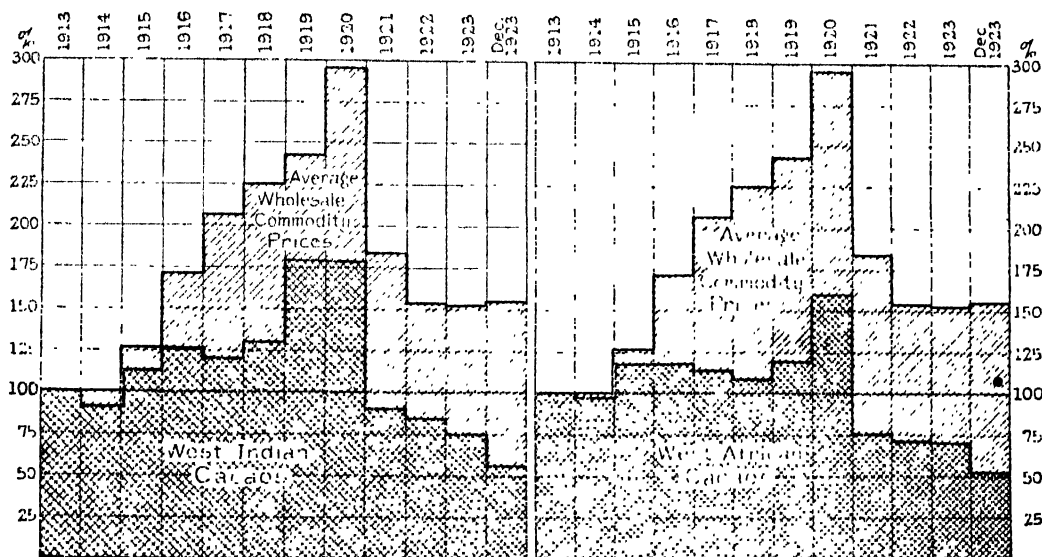
Yields in Sumatra are, of course, high—a usual accompaniment of new plantations on virgin soil—and this results in a somewhat lower cost of production. Any advantage that this gives is, however, lost on the lower price fetched

by the tea. The largest group of gardens in one ownership in Sumatra (belonging to a British company) gave, in 1922, under a system of moderately fine plucking, an average yield over 9380 acres (including 443 acres of young tea) of 710 lb. per acre. The f.o.b. cost was 7·81d., and the net sale price 9·55d. (1921, 8·25d. and 8·41d. respectively). The capital cost of establishing the plantations can only be inferred from the accounts, but it appears to have been close on £100 an acre (without interest).

THE POSITION AND PROSPECTS OF THE BRITISH CACAO-GROWING INDUSTRY

In considering the position and prospects of the British cacao-growing industry the matters to be brought under review include :—

- (1) Nature of the demand for consumption and the extent to which it may be expected to increase.
- (2) Ability to withstand the competition of other cacao-growing countries of the world.
- (3) The state of cultivation and the incidence of disease as factors affecting production in British and foreign cacao-growing countries.



UNITED KINGDOM IMPORT VALUES OF BRITISH WEST INDIAN AND BRITISH WEST AFRICAN CACAOS IN TERMS OF 1913 IMPORT VALUES COMPARED WITH THE STATIST INDEX OF WHOLESALE COMMODITY PRICES.

It is also quite clear that the West Indies and West Africa, to name the two great producing groups in the Empire, are not on the same footing as regards type of product and ability to produce cheaply.

NATURE OF THE DEMAND.—Attention has already been drawn to the fact that the cacao bean yields two distinct products for which there are two distinct demands.

These products are cacao butter and cocoa powder.

It would be a remarkable fact if *any* product splitting into two different sub-products divided exactly in accordance with the requirements of the demand for each sub-product. Such a result is the category of things which are too good to be true.

One of the two sub-products will always be in greater demand than the other, and attention will be given to extracting this particular sub-product from the cheapest and most plentiful raw material, while the other sub-product being produced in excess will become a surplus. This, according to some observers, is what has occurred in recent years in regard to the two sub-products obtained from cacao.

The present position, they say, is that there is a greater demand for cacao butter than for cocoa powder. The result is that the cacao butter is largely extracted from low-grade beans, and the cocoa powder of comparatively low quality is sold at by-product prices. The cacao butter, on the other hand, is to all intents and purposes of equal value whether extracted from high or low-grade beans.¹

This fact is thought to be responsible for the way in which the prices of comparatively high-grade Trinidad, etc., cacaos have been affected by the competition of Gold Coast and other lower grade dark cacaos. The manufacturers rate the value of these cacaos for cacao butter-content practically at the same figure as the cacao butter-content of the low-grade cacao. This leaves only the cocoa powder-content to be paid for at a higher figure and the surplus of low-grade cocoa powder on the market probably comes into play in reducing even this figure. Trinidad and other bright cacaos are, however, bought for use in bringing up the flavour of the lower grade cacaos which are employed as a base in most preparations.

In regard to Trinidad, etc., therefore, a transition has taken place since the great increase in the output of lower grade cacaos. From being used (more or

¹ The total percentage of fat in the nibs is almost invariably 50 regardless of the country of origin. For instance :

	Per cent.
Caracas . . .	49.2-52.5
Trinidad . . .	54.5-55.7
Africa . . .	50.2-53.5
Grenada . . .	50.8-55.3
Guayaquil . . .	50.0-54
Bahia . . .	50.2-54

These are old analyses, and recent figures for Accras show 55.3-56 ; Ceylon, 54-56 ; Trinidad, 54-56. For general purposes a figure of 50.1 per cent is taken for nibs, and is a good commercial figure to work upon. The total amount of fat that can be extracted by pressure varies considerably with the temperature and pressure exerted, and cocoa powders occasionally contain a range of 22-35 per cent of fat left in. It is, of course, possible to extract the total amount of fat from the nibs by means of solvents, and quite a considerable amount of cacao butter on the market is solvent-extracted. There is also some butter being offered which has been extracted from waste chocolates and cocoa.

Butter extracted from the husks is always extracted by means of solvents. This fat may be taken to range between 3.5 per cent and 8 per cent of the raw husk, and is commercially known as shell butter, used principally for pharmaceutical purposes.

less) as a base—or at all events in larger proportion than at present—they have become flavouring agents. By referring to the table on page 163 it will be seen that the output from countries producing high-grade cacaos has remained stationary, while that of the lower grade cacao producers has increased at a rapid rate.

It cannot be said that every one in the cacao industry agrees with this reading of the position; but the view of underlying conditions, just explained, is that held by many well-informed people, and there is no doubt of the fact that in the larger chocolate factories of Great Britain and America definite changes in formula have in recent years been made to enable them to work on Gold Coast cacao as the basic grade for general consumption.

The better kinds of Ceylon cacao—fair to fine bold—are a class apart. Being in comparatively small supply they (in the main) command their market and their price, which is often the highest paid for any kind of cacao.

THE INCREASE OF CONSUMPTION.—The fact that consumption (*vide* table p. 169) has made such rapid strides during a period such as that through which the world has been passing is the most satisfactory feature of the situation, and it is reasonable to believe that as the Continental countries extricate themselves from their difficulties their consumption of cacao will grow. A cheap foodstuff in the coming condition of the world may be trusted to create its own demand, and (in spite of all that is said against it) there is no doubt that the class of cocoa powder, which grocers stock in barrels and retail loose, must be of great assistance in balancing the budgets of working-class families, especially when there are many children.

The two largest consumers at present are America and Germany; the former country considerably increased its purchases during 1923, but Germany, which made a marvellous recovery in cacao consumption during 1921 and 1922, has fallen back, owing to circumstances which are common knowledge; the eventual revival of the purchasing capacity of that country is, however, not a matter of doubt. There are many countries which hardly figure at present as cacao consumers at all. Chief of these is Russia, where cocoa and chocolate even before the War were practically unknown. With its long and rigid winter it is distinctly the country which offers the biggest field for increased cacao consumption in future.

COMPETITIVE POSITION OF BRITISH CACAO-GROWING INDUSTRY.—As the survey has been confined to British cacao-growing countries the information is lacking on which to give a fully considered opinion on the ability of the British cacao industry to compete with foreign-grown cacao. The history of the rise of the industry—combined with the fact that it has either held its own, as in the case of the West Indies and Ceylon, or greatly increased its output other countries remaining at a standstill—proves, however, that it is not menaced in any way by competitors outside the Empire, and in point of productive capacity and potential productive capacity it leads the world. The only important new competitor that seems likely to emerge in the near future is the French Ivory Coast, which increased its shipments from 950 tons in 1919 to 2360 tons in 1922, but it is difficult to obtain particulars of the extent of new cultivation in that country.

In regard to competition in quality, there is need to deplore the condition in which a large proportion of Gold Coast and (worse still) Lagos cacao reaches the consuming markets, and strenuous effort is necessary to improve these types. However, the nearest foreign competitive cacao to Accras, etc., is Bahia, which is also defective. The U.S.A. recently closed its doors to all cacaos containing more than 15 per cent of defective beans, and the risk of this being followed must be kept in mind. As often happens, there has been a tendency for the quality of even the best cacaos (Central American, etc.) to decline with the declining prices that have made cultivation less profitable and proper preparation more of an expense.

Speaking generally, British Colonial producers of cacao are their own greatest competitors.

THE INCIDENCE OF DISEASE AND PESTS AND STATE OF UPKEEP OF PLANTATIONS.—So far the British Colonies have been relatively free from serious disease of cacao, but the risk is a considerable one and must increase if the period of low prices making the plantations so much the less valuable and so much less worth preserving by proper attention is prolonged. Stress is laid throughout this book on the financial factor, since it is ultimately the deciding factor. Quality of product, disease control, upkeep and extension of plantations, and the safeguarding of future output all depend on an adequate financial recompense being forthcoming.

The destructive effect of "cacao thrips" may be judged from the statistics of exports from St. Thomas (*vide* table p. 163). As a direct result of the depredations of the pest, exports in 1922 (and also it may be said in 1923) were reduced to little over 50 per cent of the average annual exports during 1913-17—a clear loss of 16,000 tons to the world's supply in one year. The pest has been in evidence in St. Thomas (San Thomé) for several years, during which it has much reduced the output and vitality of the trees. Fifty per cent of the young trees are said to have perished and older trees were also greatly damaged. A similar visitation of the cacao plantations in Surinam by this pest, followed by an attack of "dieback," was the cause of the loss of 2269 acres of cacao during 1902-8 out of a comparatively small acreage under the crop. A country suffering great damage from disease at present is Ecuador ("witch broom" disease); the results will be shown in the export statistics for the complete years 1923 and 1924 when available, as it only made its appearance in 1922.

These facts will make it evident that the danger is one which needs control. The growing seriousness of the menace in the Gold Coast Colony has already been dealt with somewhat fully. Incidentally, any further extension of the disease area in Ecuador, resulting in a heavy reduction in output, is bound to affect the demand for other cacaos.

THE PARTICULAR CASE OF THE WEST INDIES.—Like the situation in the Gold Coast Colony, the difficult position of the West Indian cacao industry has already received extended consideration. Professor W. R. Dunlop (of the Imperial College of Tropical Agriculture), who since our remarks on this subject were set down has published¹ a careful critical survey of the state of

¹ *Tropical Agriculture* (Trinidad), January, 1924.

the Industry in Trinidad, has come to the definite conclusion that nothing short of complete reconstitution will avail to save the Industry (but not the planters!). In other words, he anticipates the wholesale foreclosure of mortgages and the working of estates by the mortgagees in possession.¹

For a full understanding of the position it is necessary to take into account the conditions under which the Crown Lands were planted up some thirty or forty years ago, when the rapid establishment of cacao estates began. It was then the recognised local custom to acquire suitable land, freehold, at the usual moderate price, and for the owner to develop a small part of it himself, and most of the remainder by means of the contract system, whereby the contractors, usually natives, brought the cacao into bearing and were then paid for the established plantations on a more or less arbitrary basis of valuation of about fourpence per tree, arrived at by capitalising the return to be expected under conditions existing at the time. In order to carry out this development and make payment to the contractors, which involved in many cases thousands of pounds, the owners of the estates borrowed money on mortgage. Subsequently, also, in bad years, further mortgages might be incurred. The ultimate result was that the majority of cacao estates in Trinidad became heavily encumbered; but since the good price of cacao and the bountiful productive powers of virgin soil brought in a large return, it allowed of the payment of a high rate of mortgage interest without inconvenience, which in its turn provided a profitable investment to the mortgagee; and both parties being satisfied, neither had much inclination to come to any settlement in respect of the principal involved.

When in 1920, after a bad climatic season, the price of Trinidad cacao fell 50 per cent of what it had been before the War, cacao planters found themselves financially embarrassed. This was aggravated by the fact that the output per acre had been growing less and less, which in the last few years has continued, owing to financial deficiencies in respect of running the estates on sound agronomic lines.

At the time when the crisis began—in 1920—the Government, in order to help the basic industry of the Colony, introduced an Agricultural Relief system of financial aid, and lent money to encumbered estates, claiming in doing so first mortgage (even on estates so encumbered). In addition a moratorium was passed, making it illegal for mortgagees to foreclose unless payment of interest was withheld beyond a certain time. This latter action was primarily taken to prevent the withdrawal of foreign loans on cacao, which in Trinidad are considerable and amount to several hundred thousand pounds. Both moratorium and relief, which are still in operation, are likely to be lifted in 1924. But, in Professor Dunlop's view, "unless a sudden and substantial improvement takes place in the marketing aspect, the final result cannot be other than a complete revolution in ownership and industry—which, while

¹ In this connection it may pertinently be asked "Are the mortgagees anxious to foreclose?" Practical experience teaches us that a mortgagee is often better off (especially when an estate has been mortgaged for more than its value) to have the debt rather than the property so long as the formal owner is willing to work it and endeavour to make ends meet.

conferring hardship and perhaps ruin on many, will probably in the long run be the best thing for the Colony."

As mentioned in the chapter on the Cacao Industry of the West Indies, the authority of the Colonial Office has been obtained for the establishment of a permanent Agricultural Bank. This institution will lend public money in the form of mortgage loans on an amortization basis, and will advance money also against crops. The situation can, however, only be partially relieved by these means. Estates at present carry loans against valuations fabulously fictitious at the present time. Indeed, much of the present trouble lies in the circumstance that valuations were made on the basis of market prices for cacao. Obviously, if the price of cacao falls for a period of years below the cost of production, a cacao tree is commercially valueless and the property becomes in theory (and in reality) so much bush covering an impoverished soil. These facts are not open to contradiction, and agreement will be general with Professor Dunlop's statement that unless there is a revival in prices the conservation of the Industry depends upon an economic adjustment being made between higher yields and lower cost of production. Whether he is equally justified in his further view that lower costs can be effected immediately by the elimination of mortgage interest (foreclosure) and reform in management is for the mortgagees themselves to consider. Although at the time of writing the market prices of both Accras and Trinidads, etc., are only just above the lowest levels recorded, there seems to be an appreciable improvement in the tone of the market and it is possible that a turn for the better is about to come.

PROSPECTS OF THE COFFEE-GROWING INDUSTRY IN THE EMPIRE

Little can be added to what has already been said on the subject of the state and prospects of the coffee-growing industry in the Empire. In Kenya the prospects are moderately bright and the production is confidently expected to increase largely in the next few years. In Tanganyika, as already noted, an interesting feature is the way the natives are taking up the cultivation; this development will be worth watching. Should the movement spread and gather momentum there may be a native coffee industry created in East Africa comparable with the native cacao industry in West Africa. However, it is early days yet to form any opinion on the matter.

The Indian coffee industry is not in a very flourishing condition, but is far from becoming extinct as was once expected, and a succession of good seasons followed by the introduction of some new capital might set it on its feet again. Latterly there has been a succession of unfavourable seasons. There is in South India much old coffee long past its prime, and an extremely drastic method for its renovation has been proposed and actually carried out in some instances with very good results, according to Mr. R. D. Anstead (Director of Agriculture in Southern India). The old coffee to be treated is first allowed to run up and give as big a crop as possible for one or two years, no pruning being done or suckers taken off. After the final crop has been picked the trees are sawn off at the ground level; all the shade trees are felled and the stumps dug out and

removed. The land is then forked and the soil turned up in big clods, some of these being packed over each sawn-off coffee stump to protect it. The light branches of the coffee and shade trees and all the litter are then spread over the field and the whole given a quick burn. The soil is then forked, the clods broken up and the coffee stumps cleared and an application of about a ton an acre of good slaked lime is worked into the top soil. Dadap and new shade is then planted. The coffee stumps sucker and each is allowed to grow the two most healthy shoots of those thrown out. Suckers are eventually reduced to one (the stronger) and the base is earthed up so that it can make a new root system of its own. In three to four years a complete new root system has been formed and a new healthy tree produced. The method is recommended by Mr. Anstead as being better than total replanting, which is difficult because "supplies" grow slowly and with difficulty in old coffee land and the trees produced by suckers come into bearing much more quickly than "supplies." It is not surprising to hear that the cost of treatment is heavy.

The most substantial guarantee of the future of Empire-grown coffee is the welcome it receives on the market.

The demand for coffee in the United Kingdom is principally by the middle and upper classes, and their appreciation of a good article plays a large part in assuring the demand for British plantation coffees, all of which, except the native-grown and prepared, rank among the fine growths. Among Indian coffees, Mysore takes high rank, and is a good plantation coffee, useful for the home trade. Then follows the Nilgiri coffee, to which similar remarks apply. The Coorg, the Wynaad and Travancore merit the same encomium, but on the whole are not quite so high in the estimation of the market as Mysore or Nilgiri, though some estates in these districts produce coffee above the average. The East African coffees are also much appreciated. Nairobi (Kenya) is a very popular home-trade coffee; Uganda ordinary likewise finds a ready sale but ranks slightly below Nairobi. "Toro" (from the Uganda highlands) comes in between the two. The Tanganyika coffees (Kilimanjaro, Aruschi, Moschi, Meru, Amani, etc.) rank with those of Kenya, while the Jamaica Blue Mountain coffee fetches, as has been noted elsewhere, the highest price of any kind.

Coffee brokers generally are confident of the home trade's ability to absorb much larger quantities of all these growths should they be available, but a good deal must, of course, depend on the output of mild coffees from Central America.

SECTION III

THE SPICE AND TOBACCO GROWING INDUSTRIES OF THE EMPIRE

ARRANGEMENT OF THE SECTION

SPICES. General Statistical Survey, p. 234 ; Cultivation of the Principal Spice Plants, p. 241 ; Geographical Survey : India, p. 247 ; Ceylon, p. 253 ; British Malaya, p. 255 ; Sarawak, p. 258 ; Zanzibar and Pemba, p. 259 ; Kenya and Uganda, p. 268 ; Sierra Leone, p. 269 ; British W. Indies, p. 270.

TOBACCO. General Statistical Survey, p. 271 ; Geographical Survey : Great Britain and Ireland, p. 275 ; India, p. 276 ; Ceylon, p. 278 ; British Malaya, p. 283 ; British N. Borneo, p. 283 ; Papua and New Guinea, p. 284 ; Australia, p. 285 ; Union of S. Africa, p. 286 ; Southern Rhodesia, p. 290 ; Northern Rhodesia, p. 291 ; Nyasaland, p. 291 ; Canada, p. 293 ; Final Remarks, p. 298.

CHAPTER I

THE SPICE INDUSTRIES OF THE EMPIRE

(1) GENERAL STATISTICAL SURVEY. (2) CULTIVATION AND PREPARATION OF THE PRINCIPAL SPICES.

(3) GEOGRAPHICAL SURVEY

The Spice Industry of the British Empire : General Survey. Spices on the London Market. Market values. Spice Import and Re-shipment Trade of the United Kingdom. Cultivation of the Principal Spice Plants : Pepper (Black and White). Chillies (Red or Cayenne Pepper). Caramoms. Cinnamon. Cloves. Ginger. Pimento or Allspice. Nutmegs and Mace. Vanilla. The Spice Trade of India : Imports and Exports. Ceylon Spice Industry and Trade. Spice Trade and Industry of the Straits Settlements and British Malaya : Imports and Re-shipments of Pepper. Cloves and Nutmegs. Clove Industry in Penang. Nutmeg Industry in Penang. Trade Customs. The Sarawak Pepper Industry : Methods of Financing Crops. Local Methods of Cultivation. Preparation of Pepper (Sarawak Methods). Prices. The Spice Industry of Zanzibar and Pemba (Cloves and Chillies) : Export Trade in Cloves and Clove Stems. Chillies. Spices in Kenya and Uganda. Spice Industry of Sierra Leone. The Spice Exports of Nigeria. Spices in the British West Indies.

With the one exception of vanilla the British Empire is amply self-supporting in relation to Spices and in addition produces a considerable surplus for the supply of the outside world. Spices may be described as luxuries rather than necessities of life, and consequently any greatly increased cultivation of these products would soon swamp the market and reduce their value. On the other hand, they are used in such infinitesimal proportions to other food that their consumption should be relatively unaffected by periods of bad trade, or in countries suffering from depreciated exchange. Unfortunately the theory is not always borne out.

As will be seen hereafter, the study of supply and demand is complicated by the fact that many so-called spices are also used in the drug trade, or are distilled for the purpose of obtaining essential oils, which are employed in

perfumery, as flavouring ingredients in confectionery, "soft drinks," etc., and for a variety of other purposes. The conditions in all these consuming industries react on the demand, and further complications ensue through some of the essential oils derived from spices being more or less replaceable by others and by synthetic perfumes, etc. More cloves, for instance, are absorbed in the manufacture of clove oil than as spice, and cloves are by no means the sole source of clove oil; again, through the preparation of vanillin from this base, cloves are brought into competition with vanilla—a spice now mainly supplied from the French possessions (Madagascar, Tahiti, etc.). So small is the annual production of vanilla in the Empire (amounting to about one ton from the Seychelles Islands and an approximately equivalent amount from Mauritius) that it requires no further mention in this survey. In Madagascar and its dependencies there are at present estimated to be about 16,000 hectares (1 hectare equals 2·47 acres) of vanilla under cultivation, but the output from Tahiti has declined considerably in recent years, and the world's supply is at present below requirements for consumption.

1. GENERAL STATISTICAL SURVEY

Owing to the differences in classification and incompleteness of official records, statistics regarding the production and consumption of spices are difficult to procure, but the following is believed to be as complete a return as is obtainable of the production for export in the British Empire :—

NET EXPORTS OF SPICES FROM THE BRITISH EMPIRE

	Quantity.		Value.	
	1913. cwt.	1922. cwt.	1913. £	1922. £
CHILLIES :				
British India	143,777	162,752	134,220	341,254
Nyasaland	—	127	—	—
Kenya and Uganda	7,205	9,588	8,247	43,951
Zanzibar	683	706	1,042	3,088
Sierra Leone	174	2,487	565	9,431
Nigeria	2,476	3,074	1,205	4,166
	1913-14. cwt.	1922. cwt.	1913-14. £	1922. £
PEPPER :				
British India	123,928	106,212	289,943	208,671
Sarawak	50,922	32,586	156,328	—
Ceylon	—	1,532	—	3,607
GINGER :				
British India	82,272	60,586	122,661	122,550
Sierra Leone	40,949	26,605	35,468	36,088
Jamaica	21,235	12,361 ¹	36,639	43,350 ¹
CINNAMON :				
British India	296	²	1,015	²
Ceylon (including chips)	45,900	42,974	160,908	132,845
Seychelles (output marketed as cinnamon oil)				

¹ 1921 figures (later particulars for quantity on p. 270).

² No longer shown separately in official returns.

	Quantity.		Value.	
	1913-14. cwt.	1922. cwt.	1913-14. £	1922. £
CLOVES :				
Zanzibar and Pemba	159,042	186,624	412,547	764,270
Straits Settlements (Penang)*	553	328	—	—
Ceylon	130	125	461	488
CLOVE STEMS :				
Zanzibar and Pemba	17,322	22,491	17,322	23,990
CARDAMOMS :				
British India	3,334	4,523	49,994	46,681
Ceylon	4,051	4,096	62,157	33,333
NUTMEGS :				
Grenada	14,556	22,542	25,205	59,959
Straits Settlements (Penang)	1,488	581	—	—
Ceylon	105	195	172	326
MACE :				
Grenada	2,397	3,186	18,939	17,065
Straits Settlements (Penang)	384	346	—	—
PIMENTO :				
Jamaica	135,612	80,492 ¹	88,148	44,272 ¹

SPICES ON THE LONDON MARKET.—The biggest part of the London business in spices is now done on c.i.f. contracts for the United Kingdom or the Continent. This applies to the whole range of spices, except cardamoms, and is particularly true of pepper and cloves. Cardamoms in the London trade are considered a drug and are accordingly sold in the periodical Drug Auctions; they are seldom bought or sold on the c.i.f. contract, but are shipped to London on consignment terms, and either put into the auctions or sold privately. Turmeric, which is sometimes considered a spice, and sometimes a dyestuff (it has both applications, and is used in this country in pickles), is also sold in the Drug Auctions.

The general c.i.f. contract for spices calls for "Fair London Standard." If the quantity is found not to be up to the standard, an allowance is made off the price; this may be decided between the parties or settled by arbitration. The average allowance on pepper may be about $\frac{1}{4}$ d. to $\frac{1}{2}$ d. per lb. There is no question of refusing to take up a contract because of quality being below standard.

The allowance on cloves is generally much larger than on pepper; occasionally up to 4d. has to be allowed.

A large speculative business is done in pepper, cloves, etc. Spice business generally is under the rules of the London General Produce Brokers' Association. Spice auction sales are held occasionally at the Commercial Sale Rooms, Mincing Lane, but there is not the spot demand there used to be.

A few leading shippers have their own "types" of cinnamon, ginger, chillies, etc., and these being in some cases better than "Fair London Standard" sell at higher prices.

All spot business is done on wharf-drawn samples.

¹ 1921 figures (later particulars for quantity on p. 270).

Pimento is also sold on a c.i.f. contract basis, but the guarantee is "fair average quality." Incidentally it may be said that pimento varies very little in quality.

WHARFINGERS' CHARGES ON SPICES (LONDON), ALL PLUS 50 PER CENT ON RENT AND 100 PER CENT ON OTHER CHARGES

PEPPER: *Black or white*, per ton, landing 5s. 6d., reweighing, repiling, or rehousing 2s. 3d., delivery to land conveyance 2s. 9d., delivery to water conveyance 5s. 6d., rent 6d. per week per ton.

Consolidated rate, including sorting and sampling at time of working, in bags 9s. 3d. per ton, in barrels or cases 12s. per ton. Taring or bulking, in addition. *Cayenne, pod, or bird*, reweighing, repiling, or rehousing 3d. per cwt., landing, housing, weighing, and delivery 10d. per cwt., rent 7½d. per week per ton.

Long, reweighing, repiling, or rehousing 3d. per cwt., rent 7½d. per week per ton. Landing, housing, weighing, and delivery 6½d. per cwt. Examining externally for damage at landing 1½d. per bag.

PIMENTO: Per cwt., landing 9d., reweighing, repiling, or rehousing 3½d., delivery to land conveyance 4½d., delivery to water conveyance 6½d., rent 7d. per week per ton.

Consolidated rate, including bulking and sampling at landing in bags, 1s. 1d. per cwt. Examining externally for damage at landing 1½d. per bag.

CHILLIES: Reweighing, repiling, or rehousing 3d. per cwt., rent 7½d. per week per ton. Landing, housing, weighing, and delivery 11d. per cwt.

CLOVES: In cases or chests, per cwt., landing 9d., reweighing, repiling, or rehousing 3d., delivery to land conveyance 4½d., delivery to water conveyance 7d., rent 7d. per week per ton. Management rate, comprising handling, wharfage, weighing gross, ordinary mending, housing, weighing at delivery if requires and delivery to land or water conveyance, 1s. 6d. per cwt. Bulking in addition 2s. 3d. per cwt. In bags, bales, or mats per cwt., landing 7d., reweighing, repiling, or rehousing 2½d., delivery to land conveyance 3½d., delivery to water conveyance 5d., rent 6d. per week per ton. Management rate, as above, 9d. per cwt. Bulking in addition 10d. per cwt.

CLOVE STEMS: In bags, bales, or mats, per cwt., landing 7d., reweighing, repiling, or rehousing 2½d., delivery to land conveyance 3½d., delivery to water conveyance 5d., rent 6d. per week per ton.

Management rate (operations as cloves) 8d. per cwt. Bulking in addition 8d. per cwt.

CARDAMOMS: Per cwt., landing 10d., reweighing, repiling, or rehousing 4d., delivery to land conveyance 5d., delivery to water conveyance 7½d., rent ½d. per week per case under 56 lb.¹

NUTMEGS: Per cwt., landing 8d., reweighing, repiling, or rehousing 2½d., delivery to land conveyance 4d., delivery to water conveyance 6d., rent ½d. per week per cwt.

Management rate, including landing, weighing, ordinary coopering, housing, original warrants (stamp in addition), six weeks' rent from breaking bulk of vessel, weighing at delivery (if required), opening, starting, bulking, taring, sorting, lotting, sampling from bulk, repairing, retaring, refilling, reweighing, nailing down, bags supplied for overtakers, and delivery 2s. 10d. per cwt. Ditto, including garbling, 5s. 6d. per cwt.

¹ The rent on cardamoms in cases, 56 lb. to under 1 cwt., is 1d. per week; 1 cwt. and under 2 cwt., 1½d.; 2 cwt. and under 3 cwt., 2d., etc. Cardamoms in bags are charged 1s. 3d. per ton for rent. (All as usual plus 50 per cent.)

Wild, per cwt., landing 8d., reweighing, repiling, or rehousing $2\frac{1}{2}$ d., delivery to land conveyance 4d., delivery to water conveyance 6d., rent $\frac{1}{2}$ d. per week per cwt.

Management rate (without garbling) 2s. 1d. per cwt. Broken, in bags, per cwt., landing 8d., reweighing, repiling, or rehousing $2\frac{1}{2}$ d., delivery to land conveyance 4d., delivery to water conveyance 6d., rent $\frac{1}{2}$ d. per week per cwt.

Management rate (without bulking) 1s. 6d. per cwt.

MACE: Per cwt., landing 1s., reweighing, repiling, or rehousing 4d., delivery to land conveyance 6d., delivery to water conveyance 9d., rent $\frac{3}{4}$ d. per week per cwt.

Consolidated rate (bulking not included) 2s. 9d. per cwt. Wild, per cwt., landing 10d., reweighing, repiling, or rehousing 4d., delivery to land conveyance 5d., delivery to water conveyance $7\frac{1}{2}$ d., rent $\frac{1}{2}$ d. per week per cwt. Consolidated rate (bulking not included) 2s. 1d. per cwt.

GINGER: Preserved, dry, or in casks, per cwt., landing 6d., reweighing, repiling, or rehousing $2\frac{1}{2}$ d., delivery to land conveyance 3d., delivery to water conveyance $4\frac{1}{2}$ d., rent 8d. per week per ton.

In jars or tins in cases, per cwt., landing 7d., reweighing, repiling, or rehousing $2\frac{1}{2}$ d., delivery to land conveyance $3\frac{1}{2}$ d., delivery to water conveyance 5d., rent 8d. per week per ton.

GINGER: Dry, per cwt., landing 5d., reweighing, repiling, or rehousing 2d. per cwt., delivery to land conveyance $2\frac{1}{2}$ d., delivery to water conveyance 4d., rent 6d. per week per ton. East India or Japan, in bags or pockets:—

Consolidated rate, including sorting and sampling by bulking not more than 5 per cent, at landing 8d. per cwt. Bulking the whole parcel, when ordered, in addition 7d. per cwt.

East India or Japan, in cases:—

Consolidated rate, including sorting and sampling at time of bulking, 10d. per cwt.

Bulking rate when garbled 10d. per cwt., when not garbled 8d. per cwt.

When not bulked, sorting $1\frac{1}{4}$ d. per cwt., taring and sampling separately 1s. 2d. per cwt.

West India, in bags, consolidated rate, including sorting and bulking the whole parcel and sampling at landing 1s. per cwt.

West India, in casks or cases, consolidated rate, including taring and sampling at landing 1s. 4d. per cwt.

CINNAMON: Landing and housing rate, comprising landing, wharfage, weighing, furnishing, landing weights, housing, and delivery to land conveyance 2s. per bale. Additional for delivery to water conveyance $6\frac{1}{2}$ d. per bale, rent $\frac{3}{4}$ d. per bale per week.

Management rate, comprising landing, wharfage, weighing, housing, unpacking, taring, sorting, sampling, repacking, reweighing, piling away and delivery to land conveyance 4s. per bale. Additional delivery to water conveyance $6\frac{1}{2}$ d. per bale, rent $\frac{3}{4}$ d. per bale per week.

An additional charge will be made for cases, gunny and rope if supplied, and for brushing and attendance on show if incurred.

Cinnamon chips or dust, landing, housing, weighing, and delivery 1s. 1d. per cwt., rent $\frac{3}{4}$ d. per week per cwt.

MARKET VALUES.—The tendency of the spice market during 1922 and 1923 was upward. Black Singapore pepper was quoted $3\frac{3}{4}$ d. c.i.f. in January, 1922, and had risen by the end of that year to $4\frac{1}{4}$ d. and by the end of 1923 to $4\frac{3}{4}$ d. Cardamoms sold during 1922 at 3s. 6d.–5s. per lb. for "bold" (1923, 5s. 6d.–6s.).

Cloves fluctuated considerably; starting 1922 at 1s. 3d. for spot, they moved

for a time between 1s. and 1s. 6d. and then fell to 8½d. on the arrival of the new crop ; c.i.f. values at the end of the year were 6½d. In 1923, after starting at 7d. c.i.f. the price mounted steadily during the year to finish at 1s. 4d. for January-March, 1924, shipment. The strong market coincided with a record crop for size and one of very inferior quality. The new crop (1924-25) is expected to be exceptionally small and the visible supply points to a marked shortage before another season's supplies are available.

SPICE IMPORT AND RE-SHIPMENT TRADE OF THE UNITED KINGDOM.—The spice import and re-shipment trade of the United Kingdom is summarised in the following table :—

CINNAMON :

Imports.	Quantity.		Value	
	1913 cwt.	1922 cwt.	1913 £	1922 £
From Seychelles	900	—	1,009	—
„ Ceylon and Dependencies	5,677	1,766	19,123	6,874
„ Other British Possessions	486	185	1,596	694
British Empire Total	7,063	1,951	21,728	7,568
From Foreign Countries	155	428	155	1,332
Total Imports	7,218	2,379	21,883	8,900

GINGER :

From Sierra Leone	6,042	12,454	6,634	22,968
„ British India	20,856	18,000	36,281	45,724
„ British West Indies	10,992	6,205	27,972	54,027
„ Other British Possessions	109	392	229	828
British Empire Total	37,999	37,051	71,116	123,547
From Foreign Countries	1,276	1,804	1,696	5,438
Total	39,275	38,855	72,812	128,985

PEPPER :

From British E. Africa	1,293	2,708	2,507	17,413
„ British India	12,384	6,654	31,298	19,151
„ Straits Settlements ¹	48,282	95,954	164,717	277,229
„ Ceylon	1,317	401	3,508	1,084
„ Other British Possessions	1,849	4,488	1,823	15,604
British Empire Total	65,125	109,305	203,853	330,481
From Foreign Countries	52,524	27,045	157,391	74,971
Total	117,649	136,350	361,244	405,452

¹ The Straits Settlements is the receiving and shipping centre for pepper from Sarawak, etc.

	Quantity.		Value.	
	1913 cwt.	1922 cwt.*	1913 £	1922 £
CLOVES :				
From Zanzibar and Pemba . . .	included	48,951	included	270,283
„ Kenya Colony . . .	in other	727	in other	4,783
„ British India . . .	spices	1,791	spices	15,000
„ Straits Settlements . . .	„	570	„	6,140
„ Other British Possessions . . .	„	—	„	—
British Empire Total . . .	„	52,039	„	296,206
From Foreign Countries . . .	„	1,540	„	7,663
Total . . .		53,579		303,869
OTHER SPICES :¹				
From Zanzibar and Pemba . . .	40,044	—	122,150	—
„ British India . . .	234	3,675	917	10,500
„ Straits Settlements . . .	1,314	6,108	5,546	22,122
„ Hong-Kong . . .	989	1,969	1,513	3,905
„ British W. Indies . . .	23,966	7,220	67,683	24,536
„ Other British Possessions . . .	669	567	1,250	3,329
British Empire Total . . .	67,216	19,539	199,059	64,392
From Foreign Countries . . .	12,086	5,069	32,345	14,316
Total . . .	79,302	24,608	231,404	78,708
CINNAMON :				
To British Empire . . .	221	168	949	815
„ Foreign Countries . . .	2,574	2,015	12,030	9,391
Total . . .	2,795	2,183	12,979	10,206
GINGER :				
To British Empire . . .	4,652	2,834	9,602	11,104
„ Foreign Countries . . .	8,626	13,452	14,231	33,878
Total . . .	13,278	16,286	23,833	44,982
CLOVES :				
To British Empire . . .	—	2,424	—	12,711
„ Germany . . .	—	11,721	—	38,460
„ Netherlands . . .	—	1,954	—	11,304
„ Spain . . .	—	767	—	4,527
„ U.S.A. . .	—	23,764	—	161,139
„ Brazil . . .	—	477	—	2,916
„ Other Foreign Countries . . .	—	4,178	—	22,329
Total Foreign Countries . . .	—	42,861	—	240,675
Total . . .		45,285		253,386

¹ Includes "cloves" in 1913.

PEPPER :	Quantity		Value	
	1913 cwt.	1922 cwt.	1913 £	1922 £
To British Empire	8,771	4,628	24,289	10,784
„ Russia	2,659	306	7,879	571
„ Sweden	420	754	1,623	2,182
„ Norway	12	279	26	613
„ Denmark (including Faroe Is.)	8	71	42	178
„ Germany	8,045	13,318	26,656	24,019
„ Netherlands	3,472	1,045	11,015	2,829
„ Belgium	1,513	3,658	5,566	13,330
„ France	257	455	805	1,316
„ Spain	616	668	1,543	1,613
„ Italy	1,618	287	4,094	858
„ Austria and Hungary . . .	1,049	45	2,727	21
„ Morocco	1,266	6,192	2,957	14,168
„ U.S.A.	14,836	6,447	42,031	22,848
„ Brazil	596	9,008	1,675	19,919
„ Argentine Republic . . .	1,804	2,820	4,880	10,003
„ Other Foreign Countries .	4,217	10,045	11,028	21,233
Total Foreign Countries . .	42,388	55,398	124,092	135,701
Total	51,159	60,026	148,381	146,485
OTHER SPICES : ¹				
To British Empire	5,039	2,201	17,489	5,106
„ Foreign Countries	47,295	28,691	137,739	62,110
Total	52,334	30,892	155,228	67,216

2. THE CULTIVATION, PREPARATION, ETC., OF THE PRINCIPAL SPICES

Before considering their production under the appropriate geographical divisions some brief account may be given of the botanical origin of the different spices, the conditions under which the plants thrive and are cultivated, and the processes of preparation for the market. Local peculiarities in cultivation, etc., will for the most part be left to be dealt with under the various countries of production.

PEPPER (BLACK AND WHITE).—The plant from which pepper is obtained is a creeping vine (*Piper nigrum*) indigenous to the moist, low-country forests of Ceylon and South India. Both “black” and “white” peppers are obtained from the same plant. The berries (pepper-corns) when of a reddish colour are picked and spread in the sun, when they become black and shrivelled. These, when ground with the outer covering left on, form “black pepper,” or by depriving them of the black covering by maceration in water, “white

¹ Includes “Cloves” in 1913.

pepper." The pepper vine requires a moist heat with shade, and thrives up to 1500 feet above sea-level. Artificial or natural supports, in the form of posts or trees, are necessary, the latter being preferable and more durable. Erythina, mango, jak and other quick-growing trees answer well for the purpose of supports, while they also provide a beneficial light shade. In Sumatra and Malaya posts of some hard and durable wood are generally used for supports. Propagation is by cuttings, which are selected from the ends of the best-bearing vines, and may either be started in a nursery bed, or planted out in situ where they are to remain. A crop may be expected in the third year from planting, but the vines do not reach full bearing till the sixth or seventh year. The pepper vine yields two crops a year, but bears well only once every alternate year and sometimes takes three or four years to recover from the effects of overbearing. With good cultivation it is considered that a return of 2000 to 3000 lb. per acre should be obtained, allowing for the plants to be planted 7 feet by 7 feet, or 880 to the acre. The most economical method is to grow the vines on trees which are used as shade for other crops, as "dadaps" in tea or cocoa.

CHILLIES (RED OR CAYENNE PEPPER).—Capsicums, or chillies (there are three important species of which "bird's-eye" is the most important), are cultivated all over the warmer regions of the world and have a more extended area than any other spice. A very large proportion of the cultivated fruit is used locally and fresh, for all through the tropics it is considered by the natives as a necessity of existence. The plants are easy of cultivation. They are usually grown as annuals and replanted each year, but can be grown continuously for two or three years.

CARDAMOMS.—The plant (*Elettaria cardamomum*, Scitamineæ) is a perennial with large leafy shoots, 8 to 15 feet long, and strong creeping root-stock (rhizome), native of the moist forests of Ceylon and Southern India up to 3000 feet. In cultivation it thrives best at 2500 to 3500 feet, and in partial shade. When starting a plantation sufficient forest trees are left to provide shade, as well as to afford protection from strong wind and sun. The spice consists of the fruit, or rather the numerous small seeds enclosed by the green ovoid capsule. The fruits are gathered before being fully ripe, washed free from sand, etc., and then subjected to sulphur fumes, after which they are bleached in the sun; when dried and ready for export they are of a pale straw colour. As they vary in size and shape, from $\frac{1}{2}$ to $\frac{3}{4}$ inch long, and from oblong to oval or almost round, they are graded for export. Cardamoms are a powerful aromatic and are used as an ingredient in curry powder for flavouring cakes, Bologna sausages, liqueurs, etc., and in medicine as a diadener of tastes. The seeds are much esteemed by the natives for use with masticatories, or for sweetening the breath. The plants are increased by division of the "bulbs" (rhizomes), or by sowing seed in well-prepared nursery beds. In planting out, two to four "bulbs" or plants are placed in each hole or clump, these being 7 or 8 feet apart each way, or about 850 to the acre. There are two varieties—the "Mysore" and the "Malabar." The former is known by its smooth leaves, whereas in the latter the leaf has a velvety underside, and the fronds do not

grow so tall. In the Mysore variety (which is preferred for cultivation) the racemes on which the fruit form, grow vertically, and when loaded with crop they bend outwards in a semicircular curve with the tips sometimes touching the ground, while the racemes of the Malabar variety creep out horizontally along the surface of the soil. A small crop may be expected in three years from the time of planting.

It used to be supposed that cardamoms were played out after ten or fifteen years of age ; but this has been proved a fallacy, as fields over thirty years old are still known to be yielding well. All depends on the climate and situation. The capsules are collected by women and children and are manufactured into either (1) bleached or (2) green dried. In the former case the fruit is bleached, soaked, and dried in sulphur fumes, the process being repeated until the required pale colour is secured, and the ends are clipped off by hand or by a clipping machine. In the latter case the fruits are merely dried in the sun. The dried green cardamoms are supposed to be more highly flavoured than the bleached. The essential oil used medicinally as a carminative and in connection with perfumery in France and the U.S.A. is derived, not from the Malabar or Mysore cardamom, but from the so-called greater cardamom of Nepal (*Amomum subulatum*).

CINNAMON.—The true cinnamon of commerce is the dried bark of *Cinnamomum zeylanicum*, a native of Ceylon, but found also on the Western Ghats in Southern India, at altitudes up to 6000 feet. The cinnamon tree may grow to the height of 20 to 30 feet, and the trunk may be upwards of 3 feet in circumference. The trees cultivated to produce the cinnamon of commerce are coppiced, and long willowy shoots are produced, growing to a height of about 10 feet and to the size of a fair-sized walking stick. The shoots are cut, and the bark is peeled off and rolled into quills, which constitute the cinnamon of commerce. If the soil is good branches may be cut for barking from the fourth year. In Ceylon the trees blossom in January, in April the fruit is ripe, and the cutting is done from May to October. When the tree is seen to bear fruit well it is in good health, and the bark will peel without difficulty. To prove whether it is ripe, the peeler strikes his hatchet obliquely into the branch ; if on drawing it out the bark divides from the wood, the cinnamon has reached maturity ; but if not, it must go on growing. The sticks are gathered by boys and tied into bundles with coir strings ; they are then removed to the peeling stores. The operation of peeling the sticks requires considerable skill. A knife with a blade of copper $2\frac{1}{2}$ inches long, something like that used by shoemakers, sharp-pointed and slightly hooked, is employed. The peeler, seated on the ground, makes two parallel cuts up and down the length of the bark, which he then loosens with the point of the knife. He then strips off in one entire slip about half the circumference of the branch. If the bark does not come away easily, the sticks are rubbed vigorously with a round piece of hard wood, which has the effect of loosening it. The ultimate object of the methods employed is to make the bark up into quills, a quill being a rod of cinnamon resembling a thin cane 4 feet in length ; the pieces of bark when stripped are therefore placed round the sticks, both with a view to preserving their shape

and as a convenience for the next operation. They are allowed to remain for three to six hours, when fermentation takes place, and the bark is then ready for skinning, which process is accomplished in the following manner. The peeler sits with one foot pressed against a piece of wood from which a round stick slopes towards his waist. Upon this stick he lays the slip of bark, keeps it steady with the other foot, and holding the handle of the knife in one hand and the point of it in the other scrapes off the skin, which is very thin, of a brown colour on the outside and green within. This treatment of the bark leaves only that part which has the desired delicate taste ; it is of a pale yellow colour and a parchment-like texture. The bark is now left to ferment and dry, which, if the weather be favourable, takes about thirty minutes. The next process is that of forming the quills. The smaller pieces are inserted in the larger and in the process of drying the quills form rods. They are afterwards rolled into shape and made into bundles. Cinnamon chips are the small waste pieces resulting from the cutting and peeling operations and are used chiefly for the distillation of cinnamon oil ; another essential oil is derived from the leaves, and a third from the root—all have medicinal properties.

CLOVES.—Cloves are dried, unexpanded flower buds of *Eugenia caryophyllata* plucked when they assume a bright pink or scarlet colour and generally dried in the sun with or without scalding. The tree is conical in its habit and is a native of the Moluccas. The first crop may be obtained when the trees are seven or eight years old, the yield increasing till they are about fifteen or twenty years old, when from 3 to 8 lb. of dried cloves may be obtained. Further particulars will be found on page 256 (Clove Industry of Penang, Straits Settlements) and on page 259, where the Clove Industry of Zanzibar and Pemba is considered ; these islands are the chief source of supply of cloves in the British Empire, and indeed, in the world, though Amboyna in the Moluccas (the Dutch Spice Islands) and Ste. Marie and Madagascar (French Possessions) are also of some importance. It used to be said that in the Moluccas the clove trees, when in blossom, were treated like pregnant women. No noise might be made near them, no light or fire carried past them at night and no one was permitted to approach them with his hat on his head. These precautions were observed lest the tree should bear no fruit. The industry in Madagascar is of quite recent establishment, but is making rapid progress. The production¹ for the 1923-24 season in Madagascar and Ste. Marie (a small island off the coast of the former)

¹ These particulars are from American Consular reports of recent date ; the Zanzibar Government, however, is in possession (*vide* Report of the Zanzibar Commission on Agriculture, 1923, p. 42) of a full report on the clove industry in Madagascar, etc., and though this has not been published, it is understood to be of a comparatively reassuring nature (for Zanzibar producers). Giving evidence before the Zanzibar Commission, Mr. O'Connor made the following statement : " I estimate that there are about 2000 acres under cloves in Madagascar. The rumour that millions of trees have been planted recently is not correct. I visited practically all the plantations in the clove area. There are thousands of acres suitable for cloves, but the planters will find many difficulties in their way if they attempt large plantations. Labour is scarce, there are no roads at present, the product is taken to the coast, either by porters or in dug-out canoes on the rivers. Cyclones will be the chief obstacles. The clove industry had to be abandoned both in Mauritius and Réunion on account of the periodic hurricanes."

is estimated to be 18,760 cwt. This is due to the extension of clove planting on the mainland of Madagascar in the provinces of Tamatave and Maroantsetra. Previous to 1919, the entire production of cloves was produced on the island of Ste. Marie, with the exception of a few tons grown at the botanical station at Tamatave and on small plantations near there. It is now estimated that an area of about 10,000 hectares (24,710 acres), most of which is on the island of Madagascar proper, is devoted to the growing of cloves in Madagascar and dependencies, including Ste. Marie. In the past the clove was used principally as a spice, but its main use to-day in Europe and America is for the distillation of clove oil. Part of this oil is used in tooth paste, soaps, perfumes, etc., but the bulk is employed as the raw material from which eugenol and (eventually) vanillin is manufactured. The great bulk of the Zanzibar clove crop is finally consumed in the form of this artificial vanilla flavour. Penang cloves, on the other hand, are used principally as a spice, only the highest grades being taken for the manufacture of clove oil. When clove oil exceeds the price of 3s. 6d. to 4s. per lb. the door is opened to the manufacture of vanillin by other processes, using certain coal tar intermediates as raw material. The other essential oils which contain eugenol and compete with clove oil when the latter is high in price are: Seychelles cinnamon leaf oil, Ceylon cinnamon leaf oil, and pimento oil and pimento leaf oil. The first mentioned contains 88-91 per cent of eugenol, the second about 82 per cent, while pimento leaf oil tests as high as 90 per cent and as low as 60 per cent.

GINGER.—The ginger plant (*Zingiber officinale*), is a herbaceous perennial with leafy shoots which grow to a height of about eighteen inches. It is a native of tropical Asia, but has been introduced and is now cultivated in all tropical countries. The underground tuberous stems (rhizomes), resembling thickened roots, are the ginger of commerce. These are called "hands" or "races," from their palmate shape, and are exported in two forms, peeled and unpeeled (or coated and uncoated) ginger. The former is prepared by scalding the tubers in boiling water, the epidermis being then removed by a narrow-bladed knife. Unpeeled or coated ginger (i.e. not deprived of epidermis) is merely washed, and then dried in the sun. Jamaica ginger invariably commands the highest price, Calicut or Cochin ginger usually coming second. The plant requires an equable hot and moist climate, a shaded situation, a rich well-tilled humus or loamy soil, and thrives up to 3500 feet in Ceylon. It is propagated by division of the tubers or rhizomes, which are planted in rows 2 feet apart, with 16 inches between the plants in the rows. A harvest is yielded in about ten months from the time of planting, when the leaves begin to wither. Under favourable circumstances an acre will yield from 2000 to 2500 lb. or more cured ginger, but the average return is about 1200 lb. per acre. Ginger has long been highly valued for medicinal purposes, especially in England; it is also esteemed in preserves and confectionery. The only parts of the British Empire furnishing a supply for export are India (pp. 248, 250), Sierra Leone (p. 269), and the West Indies (p. 270).

PIMENTO OR ALLSPICE.—This is the dried unripe berries of *Pimenta officinalis*, a West Indian tree belonging to the natural order Myrtaceæ.

The spice takes its popular name from its resemblance in perfume and taste to a mixture of cinnamon, cloves and nutmeg. It is also known as Jamaica pepper.

The plant is a tree from 20 to 30 feet in height at maturity. It is grown to 3000 feet elevation. Flowering commences when the tree is from seven to ten years old, and the crop of berries increases each year until maturity at eighteen or twenty years of age.

It appears to be of easy cultivation in Jamaica, but has failed elsewhere. The production in Jamaica is derived from both wild and plantation trees. Yield varies considerably, but some trees give as much as 150 lb. of fresh, or 112 lb. of dried berries. Under cultivation the planting distance recommended is 20 by 20 feet. Oil of pimento is a yellowish to brownish oil containing eugenol. The berries contain 3 to 4½ per cent of oil, most of which is in the pericarp.

NUTMEGS AND MACE.—The nutmeg tree (*Myristica fragrans*) is a medium-sized tree, thirty to fifty feet high, a native of the Moluccas. The nutmeg of commerce is the hard, brown, oval kernel of the fruit. Immediately surrounding it is the scarlet aril or mace in the form of a net, next to which is the thick, fleshy, juicy husk. The pale amber fruit much resembles a peach or an apricot in form and appearance. When ripe the husk splits and discloses the nut covered with the mace. The male and female flowers are borne on separate trees, the proportion of males required being about ten to an acre. As it is impossible to tell to which sex a tree belongs till it has flowered, propagation by budding or inarching where practicable is preferable. Failing this, the usual plan of establishing a nutmeg orchard is to select, for planting, the largest nuts procurable; these, when freshly gathered from the trees, are sown in nursery beds at 2 or 3 feet apart. In about four to seven years, according to locality, the young plants begin to flower, or "declare," as it is termed. The male trees generally "declare" earlier than the females, and bear a different flower; most of the males are cut out, a few being kept, in the proportion of one male to thirty females, for the purpose of fertilisation. When the female trees have "declared," and suitable weather offers, they are transplanted to the spot where it is intended to establish the cultivation. Here they are planted out at distances varying from 15 to 30 feet apart, according to the judgment of the planter, and the male trees evenly distributed between them. Care is taken that the transplanting is done in rainy weather, and that the roots are injured as little as possible; any broken roots are cut off with a sharp pruning knife. After transplanting, the trees are securely fastened to stakes, and, provided ordinary care has been taken in carrying out the foregoing details, the young tree seldom dies, and in a year or so it seems to have become quite accustomed to its new situation. The growth after this depends on the locality and the amount of care given to the plant. In about fifteen years after transplanting, the nutmeg tree will be fairly established, and, provided the plants have not been set out too far apart, will have commenced to cover the ground and touch each other. At this stage all the cleaning work ceases, as neither grass nor weeds grow under nutmeg shade. The trees require but little pruning; all "gormandising" suckers which tend to spoil the natural symmetry of the trees must be removed, and

any low branches which interfere with the free passage under the trees, but beyond this no pruning is necessary. In all cases it will be seen that the establishment of a nutmeg plantation is an exceedingly protracted business, and the culture if embarked upon should be in association with some other product yielding earlier returns. Another method is to sow in pots or boxes under cover, transferring the seedlings when old enough to handle into baskets, and planting out in permanent places when 8 inches to 10 inches high. This involves cutting out many male trees when sex has been ascertained, and supplying the places.

The yield commences from the time the young trees declare their sex, and, although at first it is very small, yet it gradually increases year by year until at about fifteen years the trees yield a large quantity of nuts. Harvesting is very simple, and consists of merely picking up the nuts every day from under the trees. When first gathered they are covered with a scarlet lace-like substance known commercially as "mace."

PREPARATION OF NUTMEGS AND MACE.—After removal, the mace is flattened out either by hand or between boards. It is then placed in the sun for a few hours each day until dry, which takes usually from ten to fourteen days.

The husk and mace having been removed, the seed which is still in the shell is dried in the sun in the same way as the mace. When the seeds are dry they rattle in the shell on shaking, and are stored in the shells. As soon as sufficient stocks have been obtained, the shell or seed coat is cracked, which is done either by striking it on one end of a wooden truncheon or more economically by machinery. After the seeds are removed from the shells they are very liable to attacks of insects, especially if stored for any length of time.

Nutmegs are valued according to size, and after cracking they are sorted out and graded by weight. The three common grades are those averaging 65, 85 and 110 nuts per lb. respectively. Defective or broken nuts are converted to powdered spice by grinding and used for seasoning or preparation of nutmeg butter and in the oil of nutmegs.

The graded nutmegs are packed in cases or casks ready for export.

The nutmeg contains about 25 per cent of a fixed fat, which constitutes the nutmeg butter of commerce, prepared by crushing the seeds, heating the meal and expressing the fat.

An essential oil is also obtained by steam distillation of pulverised nutmegs, the yield of oil being from eight to ten per cent. Mace also yields an essential oil closely related to that of the nutmeg.

Both nutmegs and mace are used essentially as spice and flavouring agents; nutmeg butter is used medicinally as a basis for ointments, whilst oil of nutmegs or mace is employed in perfumery and for flavouring liqueurs. •

3. GEOGRAPHICAL SURVEY (SPICES)

3 (a). THE SPICE TRADE OF INDIA

The spice trade of India is of great importance from the standpoints both of production and Indian consumption, the country's specialities of curries and hot peppered and sweetened dishes being well known.

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No figures for the total Indian spice production are obtainable, but the area cultivated under spices and condiments in 1920-21 was no less than 1,334,101 acres. The principal spice-growing provinces were :—

Acres		Acres		Acres	
Madras .	668,780	Bengal . . .	142,900	Behar and Orissa .	61,300
Bombay .	165,001	United Provinces	71,263	Upper Burma .	65,714
		Central Provinces	57,483	Lower Burma .	29,867

INDIAN IMPORTS AND EXPORTS OF SPICES.—The following tables are explanatory of the imports and exports of spices in two recent years :—

QUANTITY AND VALUE OF SPICES IMPORTED INTO BRITISH INDIA IN THE CALENDAR YEAR 1922, COMPARED WITH THE YEAR 1921

CLOVES :	Quantity.		Value.	
	1921 cwt.	1922 cwt.	1921 Rs.	1922 Rs.
From Kenya Colony (including Zanzibar and Pemba)	77,961	76,605	50,14,233	53,47,157
From Other Countries	299	2,922	23,834	81,699
Total	78,260	79,527	50,38,067	54,28,856
GINGER	728	6,795	24,937	1,79,844
NUTMEGS	13,172	8,495	3,52,310	2,97,887
PEPPER :				
From Straits Settlements (including Labuan)	10,784	8,081	4,72,894	3,21,120
From Other Countries	164	276	7,555	11,869
Total	10,948	8,357	4,80,449	3,32,989
OTHER SORTS :				
From Ceylon	1,533	1,931	1,21,283	2,14,978
„ Straits Settlements (including Labuan)	4,309	3,077	2,00,672	1,31,983
„ Japan	297	713	9,604	19,794
„ Other Countries	697	925	29,590	56,941
Total	6,836	6,646	3,61,149	4,23,696

EXPORTS OF SPICES FROM BRITISH INDIA

CARDAMOMS	5,206	4,523	7,31,546	7,00,230
CHILLIES :				
To Ceylon	97,449	102,555	22,82,192	32,06,251
„ Straits Settlements (including Labuan)	32,401	33,037	7,42,912	9,71,010
„ Other Countries	11,164	27,160	3,47,781	9,41,555
Total	141,014	162,752	33,72,885	51,18,816

SPICE AND TOBACCO INDUSTRIES

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	Quantity		Value	
	1921 cwt.	1922 cwt.	1921 Rs.	1922 Rs.*
GINGER	59,065	60,586	15,20,224	18,38,255
PEPPER :				
To United Kingdom	3,466	3,701	1,04,911	1,10,368
„ France	450	2,850	13,500	81,600
„ Italy	11,172	41,562	3,52,303	11,90,639
„ United States	47,976	38,340	13,81,223	9,11,316
„ Other Countries	21,279	19,759	8,21,379	8,36,148
Total	84,343	106,212	26,73,316	31,30,071
Other sorts, including Cloves and Cinnamon	4,937	4,679	1,83,453	1,84,096
Total of Spices :				
To United Kingdom	16,531	25,089	4,87,404	9,73,726
„ Italy	11,272	41,612	3,55,103	11,92,640
„ Aden and Dependencies	30,443	19,888	9,41,694	7,19,551
„ Ceylon	101,023	105,233	23,72,974	32,96,230
„ United States	60,673	69,665	17,53,947	19,09,825
„ Other Countries	74,623	77,265	25,70,302	28,79,496
Total	294,565	338,752	84,81,424	1,09,71,468

It will be understood that there is also a large Indian consumption of native-grown spices in addition to the imports here shown. Very noticeable in the export statement is the small proportion which the shipments to the United Kingdom bear to the total.

CHILLIES.—As the table shows, India figures mainly as an exporter of chillies. The cultivation is a common one over large tracts in India, both as a garden and field crop. No separate statistics of production or of acreage are available, but in Madras, the province with by far the largest production, the area has been estimated at not less than 300,000 acres annually ; and while the distribution is pretty general, cultivation is particularly large in the Guntur district and the uplands of Godavari and Kistna. Outside Madras the chief producing areas are in Eastern and Northern Bengal, in the Kyaukse, Sagaing and Myingyan districts of Burma, and in Bombay, where there is extensive garden cultivation, particularly in the Dharwar, Belgaum, Khandesh, Satara, Poona and Sholapur districts. To a limited extent the crop is raised in the Punjab, where, when grown at an elevation, the chillies are said to acquire a greater pungency to which perhaps is due the popularity of the so-called Nepal cayenne. The yield is subject to great variations in different localities.

The pods are sun-dried and packed for the market in Southern India in gunnies each containing 70 to 75 lb., or in bags weighing 168 lb. gross. For export the unit of sale is the candy of 500 lb. generally, although in Tuticorin it is the tulam of 15 lb. In Bombay the sale is on the basis of a candy of 31 Bombay maunds, and in Calcutta of the bazaar maund, shipment being made from the former port in bundles of 196 lb. net, and from the latter in bags

of 205 lb. The unit of sale in Rangoon is a hundred viss of 360 lb., and chillies are packed for export in bags weighing from 48 lb. to 112 lb. net.

Of course, the bulk of the chillies grown disappears in local consumption as an ingredient in curries, chutneys and other food preparations, as already stated. The dried fruit reduced to powder is the red pepper or cayenne of commerce. The export trade does not greatly interest any large firms, and the business is chiefly in the hands of Indians with branches or correspondents in Ceylon and the Far East. The distribution and volume of the trade varies little from year to year.

GINGER.—The Indian export trade in ginger, though amounting to 60,586 cwt. in 1922, is small compared with the internal consumption for curries and medicinal purposes. Unfortunately, no statistics as to area of cultivation or out-turn are available. On the Malabar Coast, which has long been famous for its ginger, cuttings are planted in May and the rhizomes dug up in the following November. Other parts of India, where there are considerable quantities grown, are the Surat and Thana districts of the Bombay Presidency, the Rangpur district in Bengal, and the Kumaon district of the United Provinces. In a good year 2000 lb. of dry ginger to an acre is a fair average yield. The rhizomes are purchased from the cultivator by dealers, who either sell them again as green or dried ginger. Dried ginger, again, is either bleached or unbleached according as it is parboiled or scraped before being exposed to the sun. Uncoated (i.e. scraped) Cochin ginger is reputed the best marketed in India. The export trade does not attain to any great dimensions. The chief external markets for Indian ginger are the United Kingdom, Aden, the United States of America, Arabia, Turkey, Ceylon and Germany. Ginger is usually packed for export from Cochin and Calicut in double gunnies containing 1 to 1½ cwt. net, or bags containing 126 lb., the unit of sale at the former port being the candy of 600 lb., and at the latter the cwt. From Calcutta it is shipped in bags of 2 maunds and from Bombay in bags of 100, 112, and 168 lb. net, though sales are made on the basis of the cwt. at the latter port. As shown by the statistics published above, the imports of ginger into India in 1922 amounted to 6795 cwt. This was a big increase on the totals for 1921 and 1920, viz. 728 cwt. and 1098 cwt. respectively.

CARDAMOMS.—The exports of cardamoms reported for 1922 show a reduction of about 12 per cent on the 1921 total, which, in turn, was about 12 per cent below the 1920 record. There are about 20,000 acres under this product in the Madras Presidency (chiefly in the Malabar and Madura districts), Mysore, Coorg and Travancore, and 5000 acres in Bombay (chiefly in the Kanara district). The normal out-turn per acre varies from 50 to 100 lb., and apart from the exports, a great deal is consumed in India.

One company, with 563 acres under cardamoms, reported a crop of 35,497 lb. in 1921-22 and 25,370 lb. in 1922-3, equal to 45 lb. and 63 lb. per acre respectively; the cost of production in the former year was 1s. 2.60d. f.o.b., and in the latter year 1s. 11.33d. per lb. f.o.b., selling prices being 2s. 4.63d. in 1921-22 and 3s. 0.92d. in 1922-23. Another company in the same years obtained from an area of 794 acres average crops of 71½ and 63½ lb. per acre.

The capsules, which ripen in September and October, are hand gathered and sent down to the ports, and while some are dried and bleached in the sun before export, better qualities are generally cured more elaborately. (For an account of preparation see p. 243.) Cardamoms, which are packed for export from Madras ports in cases of 1 cwt. and bags of 126 or 140 lb., are usually consigned for sale to London auction rooms. The unit of sale in Bombay is the *Surti* maund of 39.2 lb. and shipment is made in bags containing 160 to 175 lb. net.

CLOVES.—The Indian imports of cloves are very large and the home production small, while the exports (included in the classification "other spices") are negligible. There is no systematic cultivation in India, and no statistics of acreage or yield are separately recorded. Cloves are chiefly grown in the foothills of the Western Ghats in the Madras Presidency.

CINNAMON.—No statistics of area or production of cinnamon in India are maintained, but the yield per acre is said to be 150 lb. The provinces contributing to the export trade are Madras and Bengal, the chief port of the former presidency being Tellichery on the West Coast. The true cinnamon is very commonly adulterated, specially in powder form, with *Cassia lignea*, the bark of *Cassia cinnamomum* common in East Bengal, the Phasia Hills and Burma, and the exports from Bengal would most probably seem to be of this origin. The principal destinations of the exports are the United Kingdom, South Africa and Mauritius. The exports in 1913-14 amounted to 33,170 lb., value £1015. The unit of sale in Calcutta is the bazaar maund, and shipment is made in bags of 2 maunds. On the West Coast sales are on the basis of the candy of 600 lb., or the maund weighing 28 lb., while exports are made in bags of 100 to 168 lb.

PEPPER.—Pepper, which has been left to the last, is the most important spice, and was once India's chief export, but the competition of the Malay Archipelago had succeeded by the beginning of the nineteenth century in overcoming a monopoly which had lasted since the fifth century, if not earlier. As shown by the statistics printed above, it is still, however, a considerable trade. Little or no white pepper is produced. Two grades of black are known on the West Coast, viz. *Alleppey* and *Tellicherry*, of which the latter in normal times commands a slight premium over the former, as the pepper is bolder and heavier. Tellicherry pepper is not only shipped from Tellicherry, but also from the neighbouring ports of Calicut, Cannanore and Badagara, while Cochin, Alleppey and Tuticorin are the outlets for the pepper grown in the Cochin and Travancore States. Pepper is packed for export from the West Coast ports in bags of 1½ cwt. net, from Bombay in bags of 70, 168 and 196 lb. net, and from Calcutta in bundles of 224 lb. net. The unit of sale in Tellicherry is the cwt., and in Cochin the 600 lb. candy. Bombay sells on the candy of 21 Bombay maunds and Calcutta on the bazaar maund. The pepper vine is largely cultivated throughout coffee estates in South Coorg and Wynaad. Perhaps, this is one of the reasons which account for the diminishing of coffee crops (to which attention has been drawn on p. 208), for the pepper must rob the coffee of a large share of nourishment. This seems abundantly evident

from the deteriorated appearance that coffee wears where a large number of vines are planted to the acre. Pepper is also grown separately in Wynaad and Malabar. Attempts to form gardens purely of pepper have not succeeded in Coorg, perhaps because it did not receive all the working that it received when planted amongst coffee. In the latter case it does not require any special attention, the cultivation carried out for the coffee sufficing for it also, so the produce forms a by-product, the only expense incurred, after planting it out and tying it to the standard whenever this is required, being the gathering of the crop, which sometimes costs Rs.100 per ton, especially if labour is scarce. The crop is sometimes sold directly off the vines to Moplah contractors, who make offers for it, and do the gathering with their own labour. It would not pay nowadays—with no prospect of there being any improvement in the prices ruling for the spice—to open a purely pepper plantation, as there is such a long period of waiting—some seven or eight years—before the vines begin to bear anything like a respectable crop. When pepper planting was first taken up in South Coorg there arose such an enormous demand for cuttings that unscrupulous vendors took advantage of it to palm off bad varieties on the unsuspecting planters, and, owing to ignorance on the part of the latter of the distinguishing characteristics of the good varieties, estates became largely stocked with the worthless *Ootherankotay* variety—literally scatter-bean—the chief distinguishing feature of which is that it sheds the greater portion of its berries throughout the season. According to a writer in the *Indian Scientific Agriculturist* (Vol. 4, No. 4) there are, besides the common jungle pepper, three good varieties which have not earned a botanical nomenclature for themselves as yet, and are known even amongst scientists by their Malabar vernacular names. The best of these is the Balamcotta, as it is a strong grower and a heavy bearer, and it possesses the advantage of flushing all over at the same time so that the crop can be harvested at one time, which is very advantageous from a planting point of view. The Kalually is a better cropper than the Balamcotta; as, however, it produces fresh sets of spike during the year, it is not considered suitable for planting, as the disadvantage of harvesting the crop over a longer period would be great in case there were labour difficulties. The Cheriakodi is a dwarf variety under 15 feet. It is quite a useful form for planting, as the spikes, though small, are usually closely packed with berries. Dr. Barber, Government Botanist, Madras, in 1906 recommended as good for propagation those vines in which the flowers are well provided with stamens as it is not safe to be guided by the crop, for many vines are occasional bearers, and wild pepper is sometimes laden with-masse of berries of large size.

The Talipafamba Agricultural Station, established by the Government in North Malabar, about six miles from the sea coast, with a view of studying the cultivation of pepper is doing good work. Since the station was started, each year, at harvest time, the best-bearing vines in each plot are harvested separately with a view to selecting the best strain of vines for propagation. As regards methods of cultivation, the practice common in Wynaad and South Malabar of moulding up the bases of the vines appears beneficial. The plants stand the hot weather well.

3 (b). CEYLON SPICE INDUSTRY AND TRADE

CARDAMOMS.—The exports of cardamoms from Ceylon amounted to 2855 cwt. in 1923, 4096 cwt. in 1922, and 4512 cwt. in 1921—a constant decrease. The distribution of exports in 1921 and 1922 (to the principal importing countries only) was :—

	1921 lb.	1922 lb.	1923 lb.
To United Kingdom	121,262	104,880	134,845
„ India . . .	164,761	214,884	48,818
„ U.S.A. . . .	131,342	69,539	37,822
„ Egypt . . .	35,460	32,038	41,300
„ Japan . . .	26,077	14,050	18,410
„ Germany . .	6,935	3,720	6,820
„ France . . .	6,008	2,203	1,133
„ Norway . . .	1,050	4,652	5,697

In 1913, Germany took as much as 27·7 per cent of the total exports, and the recent drop in her quota is doubtless due to the depreciation of the mark. The area under cardamoms in Ceylon is about 7000 acres. Little cultivation is necessary beyond weeding and yearly handling, or pruning of all decayed matter, and keeping the stools free from dead leaves or fallen twigs. It is a curious fact that no manure has been found suitable outside of virgin jungle soil or leaf mould. There is now a very small area of forest land in the island available for its cultivation, so it is not likely to increase to any extent. The average shippers' buying prices in certain years were : 1913, Rs.2·78 per lb. ; 1914, Rs.2·01 ; 1915, Rs.1·28 ; 1916, 95 cents ; 1917, 71 cents ; 1919, Rs.1·88 ; 1920, Rs.1·44 ; 1921, Rs.1·22 ; 1922, Rs.1·54. At the end of 1922, good parcels of bleached capsules were fetching an average price of Rs.2·00 in the local market. The cost of opening lands in cardamoms is said to be about Rs.200 per acre, spread over four years, and the total capital expenditure may amount to Rs.250 per acre. Production is about 80 lb. per acre, and the crop is a profitable one. On Kandaloya estate in 1922-3, 371 acres of cardamoms gave a crop of 22,551 lb., an average of 61 lb. per acre. The cost of production per lb. d/d Colombo was 53·32 cents, and the sale price in Colombo 162·94 cents, showing a profit of £4 3s. 8d. per acre, against £13 15s. 10d. profit per acre realised for tea, and £5 2s. 6d. profit per acre realised for rubber on the same estate. Another Ceylon estate (Kobonella), with 514 acres of cardamoms, gives the average cost per lb. (1922) as 1s. 10½d. against 1s. 7½d. in 1921, while the crop realised 2s. 8½d. against 2s. 8½d. in 1921.

CINNAMON IN CEYLON.—Cinnamon is Ceylon's most important spice. The exports amounting in 1922 to 42,974 cwt., consisted of 30,108 cwt. of quills and 12,866 cwt. of chips, against 30,709 cwt. of quills and 14,655 cwt. of chips in 1921 and 29,092 cwt. of quills and 16,808 cwt. of chips in 1913. The

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distribution in 1923 when the total export amounted to 31,868 cwt. of quills and 12,335 cwt. of chips and in 1922 was as follows:—

	1922		1923	
	Quills lb.	Chips lb.	Quills lb.	Chips lb.
To United Kingdom	88,215	241,667	376,667	359,227
„ Belgium	70,012	37,968	75,776	108,064
„ France	55,252	2,016	63,271	24,640
„ Germany	334,477	478,815	233,358	211,527
„ Holland	47,380	128,241	24,956	125,650
„ Denmark	15,457	5,600	7,494	4,480
„ Italy	224,441	17,448	192,524	43,400
„ Spain	611,250	91,102	685,628	122,072
„ Victoria	15,170	97,312	17,119	82,160
„ New South Wales	2,740	43,980	3,000	53,424
„ New Zealand	1,500	18,314	400	20,811
„ U.S.A.	1,446,772	33,488	1,349,551	56,080
„ Canada and Newfoundland	6,000	23,401	7,982	—
„ Other Countries in America	442,808	143,844	505,493	98,288
„ Egypt	1,127	—	18,012	—
„ India	—	5,980	3,950	39,732

One of the most striking features of the trade is the prominence of Italy and Spain, and the American and Latin-American countries as cinnamon consumers, as compared with 1921 (the figures of which year are not quoted in detail); a heavy falling off has occurred in shipments to Germany, which in 1921 took about double the quantity sent to that destination in 1923.

The area under cinnamon in Ceylon is about 25,000 acres, mostly in the Western and Southern Provinces, the most satisfactory cultivations being situated in the Negombo district. The existing gardens are mostly the survivals of the old Government Gardens, which, in the early part of the nineteenth century, supplied the world with cinnamon. It was recently reported that no fresh land was being opened in cinnamon, and that the area was being gradually reduced by the planting of old cinnamon lands with coco-nuts, but a rather keener interest is again being shown in this crop. There are nine grades of cinnamon: 00000, 0000, 000, 00, 0, and ordinary cinnamon, Nos. 1-4. The best quality is fine cinnamon prepared from tender bark. The question was recently raised by the New York Spice Trade Association whether the Ceylon Chamber of Commerce had any standard samples corresponding to this grading. It appears there are none. As was pointed out, when the matter was considered, the colour and other factors would change with keeping. The average annual shippers' buying prices from 1911 to 1921 for quills were: 1911, 58 cents per lb.; 1912, 72 cents; 1913, 69 cents; 1914, 56 cents; 1915, 42 cents; 1916, 43 cents; 1917, 35 cents; 1918, 42 cents; 1919, 69 cents; 1920, 77 cents; 1921, 48 cents; 1922, 53 cents. For chips, 1911, Rs.55.25 per candy of 560 lb.;

1912, Rs.52.67; 1913, Rs.49.20; 1914, Rs.51.30; 1915, Rs.46.21; 1916, Rs.60.11; 1917, Rs.40.39; 1918, Rs.36.24; 1919, Rs.80.15; 1920, Rs.80.20; 1921, Rs.49.83; 1922, Rs.55.61. An acre will yield about 120 lb. of quills. The cost of production of quills has been given as about 30 cents a lb.

OTHER SPICES.—The quantities of other spices exported from Ceylon will be found in the table on page 235. Though ginger is grown to a small extent in the Kandy district (probably 80 acres, yielding about 480,000 lb. of green ginger, equal to about 850 cwt. of dry ginger), the supply, which is all marketed as green ginger, is insufficient for local consumption, and the colony imports annually some Rs.86,000 worth of dry ginger. The cultivation is recommended by the Ceylon Agricultural Society for further extension in the island.

3 (c). THE SPICE TRADE AND INDUSTRY OF THE STRAITS SETTLEMENTS AND BRITISH MALAYA

Formerly Penang was the source of the finest nutmegs and cloves in the world, but the industry during recent years has almost completely died out. The cultivation of pepper was also formerly of considerable importance in several parts of the Peninsula, but has now almost disappeared.

However, though the Straits Settlements have no longer their old importance as spice producers, Singapore and Penang remain the channels through which the spice production of a large part of the Malay Archipelago passes before it reaches the outer world.

IMPORTS AND RESHIPMENTS OF PEPPER.—The principal item of this trade is pepper, and the following table gives the imports into the whole of British Malaya (including the Straits Settlements) and the exports from the same in the years 1921 and 1922 :—

	1921	1922
Imports of black pepper (piculs) . . .	126,245	225,774
" " " (\$) . . .	1,774,179	3,040,085
Imports of white pepper (piculs) . . .	120,139	91,879
" " " (\$) . . .	3,562,639	2,264,738
Exports of black, long and white pepper (piculs)	269,630	375,287
" " " " " (\$) . . .	6,629,261	7,359,425
Picul=133½ lb. Straits dollar may be taken for general purposes at 2s. 4d.		

The distribution of pepper shipments from the Straits Settlements in 1922 was as follows (principal countries only) :—

WHITE PEPPER :	Piculs	\$
To United Kingdom	54,721	1,471,374
„ Australia	12,700	325,620
„ Germany	19,273	520,081
„ U.S.A. . . .	41,314	1,019,472
„ Hong-Kong, etc. . . .	3,391	87,955

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BLACK PEPPER :

	Piculs	\$
To United Kingdom	22,962	353,140
„ Hong-Kong	16,509	236,376
„ Egypt	23,528	350,735
„ Germany	29,439	420,194
„ Italy	38,703	511,803
„ China	23,691	326,980
„ U.S.A., etc. . . .	8,527	128,233

CLOVES AND NUTMEGS.—While shipments of pepper form no index of local production—which is insignificant—the exports of cloves and nutmegs from Penang are fairly representative of the production of these crops, which is confined to Penang and its neighbourhood.

EXPORTS OF CLOVES, NUTMEGS, AND MACE FROM PENANG

	1913 Piculs	1922 Piculs
CLOVES :		
To United Kingdom	232	276
„ Continent of Europe	—	—
„ America	233	—
Total	465	276
NUTMEGS :		
To United Kingdom	396	87
„ Continent of Europe	130	25
„ America	724	376
Total	1250	488
MACE :		
To United Kingdom	24	—
„ Continent of Europe	17	—
„ America	282	291
Total	323	291

THE CLOVE INDUSTRY IN PENANG.—The clove plantations in Penang are now almost entirely in the hands of Chinese and Malays, who have interplanted rubber, coco-nuts and other products amongst the clove trees, with the result that the latter have been gradually forced out of cultivation on many of the plantations. This is responsible for the big decline in the local production.

In Penang, the clove tree commences to produce flower-buds in the fourth or fifth years after planting, but it may be considerably later if the soil is inferior. The buds are ready for gathering from November to January.

A single tree is said to produce about five lb. of cloves in a season, which, allowing 100 trees per acre, gives a yield of about 500 lb. of dry cloves per acre. Higher returns up to about 10 lb. per tree can be expected on the best types of land.

The flower stalks “ clove stems,” separated from the cloves during drying,

are sometimes dried and distilled. They contain about 5 to 6 per cent of oil and usually fetch from 3d. to 6d. per lb. for distillation purposes. The quality of Penang cloves has always stood very high in the estimation of the market. The 1922 crop fetched \$110-130 per picul of 133½ lb.

THE NUTMEG INDUSTRY OF PENANG.—Like the clove plantations, the nutmeg industry in Penang is now almost entirely in the hands of Chinese and Malays. Nutmegs, both in Penang and Province Wellesley, have been gradually replaced by coco-nuts, and during more recent years by rubber.

In Penang, in which are produced the finest nutmegs in the world, the trees are grown on the steep exposed slopes of granite hills, on which the soil consists of yellow loamy clay characteristic of the laterite formations of the Malay Peninsula. Bare clay slopes or sandy soils are considered unsuitable, whilst wet or low-lying ground is fatal to its growth. The tree fruits more or less throughout the year, but the heaviest crop is usually obtained in July and August. A yield of 750 lb. of nutmegs and 120 lb. of mace per acre is considered satisfactory under ordinary circumstances, but higher yields are frequently obtained.

TRADE CUSTOMS.—Spice exporting houses at Penang have agreed to the following trade customs :—

No Produce shall be advanced against before delivery. No Produce purchased from Chinese or Native dealers shall be received or weighed by us except at our own godowns (warehouses).

All Black Pepper shall be sifted by the Sellers at their godowns. To ascertain the dust, Buyers shall take any 5 bags per 25 tons and sift through No. 10 sieve with round holes, the percentage of dust thus determined, over 2 per cent in the case of "A," "B," and "C," and 4 per cent in the case of "D," to be deducted from the total weight.

All Pepper delivered into our godowns shall be weighed within one month after receipt, provided that the condition of the Pepper on receipt be approved by the Buyers. Should there be any difference of opinion as to the condition of the Pepper, it shall be decided by an Arbitrator appointed by the Buyer and approved by the Seller.

Buyers shall make own sample and state number of pounds and ounces of dry, clean, sifted Pepper per gallon measure. If not up to weight contracted for, Buyers shall cut ½ per cent for deficiency first ounce or fraction thereof, and 1 per cent for every further ounce, or accepts Seller's guarantee to pay any claim with respect to such deficiency. Should the parcel be over two ounces deficient in weight, Buyers shall have the option of rejecting or taking with above allowance of 1 per cent for every ounce.

In testing White Pepper Buyers have the option of taking any two opened bags to be exposed to a hot sun for two hours, any shrinkage over 5 per cent to be deducted, and Buyers to have the option of rejecting any parcel of White Pepper losing over 7 per cent. White Pepper shall be tested on the first fine days after weighing of the respective lot.

Nutmegs and Mace shall be paid for according to actual weight received after "picking." Both articles may be picked by Sellers, but in any case must be picked in our godowns. If in our opinion the goods require re-picking, this to be done at Seller's expense.

There is probably ample scope for the revival of the cultivation of a number

of spices in Malaya, especially by the native smallholder and also the European landowners on small areas.

3 (d). THE SARAWAK PEPPER INDUSTRY

Pepper growing, which used to be one of the chief industries of Sarawak, is gradually dying out, chiefly on account of a disease for which no cure has yet been found. The original cultivations were in the Upper Sarawak district and at Lundu and Simatan; large quantities are now growing in the Batang Lupar and Rejang districts, but the output of these plantations is insufficient to replace that of the areas which has died out in Upper Sarawak. The crops from these newly planted districts are superior in quality to those produced in the older districts; this fact is probably due to the washing of berries in the clear-running streams instead of in ponds, which was the more common method in Upper Sarawak. Pepper is also produced in Lundu and Simatan, but at the former place the gardens are dying out owing to the ravages of the black berry disease. It is said that the newly planted area in the second division has already been attacked by this disease,¹ and unless something is done to stop the spread of Voo Choon (as it is known) the pepper industry of Sarawak is doomed. Some measure of encouragement is to be found in the latest statistical reports of exports. The exports of 32,586 cwt. in 1922 compare with shipments of 50,922 cwt. in 1913 and 56,660 cwt. in 1911, but were much better than the figures of 1920 (21,460 cwt.). Of the 1922 total 27,380 cwt. was white pepper and 5206 cwt. black pepper.

METHOD OF FINANCING CROPS.—In Sarawak gardens are generally owned by the individual planter, who mortgages the crop to a merchant in return for provisions during the unproductive period; after the first crop is gathered, the whole of which is delivered to the mortgagee, and settlement of his account has been made, he applies for an advance on the forthcoming crop; this is usually partly given in cash and partly in provisions. The merchant sends his agent to examine the applicant's garden, who estimates the quantity of the forthcoming crop and reports to the merchant, who allows the planter up to 60 per cent of the estimated value of the crop. This system continues and advances are given against the forthcoming crop annually.

The pepper gardens in Upper Sarawak are rapidly dying out, but it is being planted in the second and third Divisions of Sarawak.

LOCAL METHODS OF CULTIVATION.—Two kinds of vines are grown in Sarawak, the broad leaf vine and the small leaf vine. They are planted from cuttings, in soil prepared with burnt earth, in the months of August and September; the cuttings are planted 4 to 5 feet apart and they require shading until they commence to shoot. When they have been planted about eight months a belian post (taut) about 16 feet long is put in the ground near the plants, leaving some 12 feet above the ground for the vines to grow around. The crop is found to require a red loamy soil and will not flourish in clay or sand.

Burnt earth is applied to the growing vine three times a year until it bears, which is about two years after planting; while the vine is maturing the flowers

appearing on the growing shoots are plucked. After two years' growth, when the vine is considered mature, flowers are left to seed, but the young shoots are thinned out continually, the stronger shoots are tied to the post by means of a jungle twine made from "kulit sla-ut"; at this period the vines are manured with prawn refuse (abok sessar), about six tahils being applied to each vine.

The crop is harvested about ten months after flowering, in the months of July to September. If the crop is weak, quantities of berries drop to the ground; these are gathered up to be marketed as black pepper. When the vines approach the bearing season they are sprayed with a mixture of rotten tobacco and tuba prepared with water; but even this spraying does not appear to prevent the spread of the fatal disease of Voo Choon.

PREPARATION OF PEPPER (SARAWAK METHODS).—White pepper is produced from the plucked berries which are gathered during the harvest, packed in gunny bags and immersed in water for about a week, or until the outer skin of the berries has rotted off. After immersion the berries are put into baskets and washed; during the process the baskets are rotated by hand, when the rotted outer skin rubs off and is easily separated from the clean berries remaining. The washed seeds are then sun-dried, after which they are shaken up in large open baskets, the stalks being separated from the seeds during this winnowing process. The dried seeds are now ready for the market; only 5 per cent moisture is allowed to be contained in the finished product; this standard is maintained by Government regulations and controlled by inspectors.

There are three methods of preparing black pepper. (1) The berries are piled in heaps in the house of the planter, where they are left for three days, after which they are sun-dried for another three days. (2) The berries are poured into boiling water, after which they are sun-dried. (3) They are smoked over a fire, being placed on mats made of small sticks and twigs, until dry.

As we have already noted, the dropped berries as well as those plucked are prepared for black pepper.

PRICES.—It is interesting to note the variation in prices of pepper in the last twenty years; this will serve as a guide to the risks incurred by the planter, and the merchant, in dealing with commodity.

In the season 1904-05 the highest Sarawak price for white pepper was \$70 (£8 3s. 4d.) per picul of 133½ lb., while in 1920 the lowest price was attained, i.e. \$12 (£1 8s.) per picul. The usual price is about \$30 (£3 10s.) per picul.

3 (e). THE SPICE INDUSTRY OF ZANZIBAR AND PEMBA

(CLOVES AND CHILLIES)

About seven-eighths of the world's clove supplies now come from Zanzibar and Pemba, while there is also a small export of chillies.¹ The cultivation was introduced about 1818 when a few seeds were brought from Réunion. By 1860 there was an annual output of 200,000 frasilas of 35 lb., and it is now more than double that amount. This result has been achieved in spite of the complete

¹ I am indebted for some of these particulars to an article in the Imperial Institute *Bulletin*.—(Editor.)

destruction of the plantations in Zanzibar Island by a hurricane in 1872, when those on Pemba happily escaped.

By concentrating their energies on cloves the Arabs became specialists in the cultivation of the tree, and their slaves became expert in its planting and in the harvesting of the crop. The status of slavery ceased to be recognised only as recently as 1897, and the freed slaves thereupon showed such disinclination for work of any kind that, though they are settled on the islands, most of the labour for working the plantations comes from the mainland and from the native inhabitants of the islands.

The geological and climatic features of the two islands are worthy of notice since these, and Penang Island in the Straits Settlements¹, are the only large producers of cloves, and probably offer the clove tree its correct environment. The clove is said never to flourish well far from the sea, being like the coco-nut in this respect. Zanzibar is situated between latitudes 5° 42' S. and 6° 28' S., the island of Pemba lying about forty miles to the north.

Geologically Zanzibar is composed of hard coral limestone, white or yellow chalky deposits, sand and red earth. The red earth is formed by the disintegration of the coral rock, and the chalky deposits may have a similar origin. The land on the west of the island rises in a series of low, undulating hills to a central ridge or plateau which passes through the centre of the island from north to south, and which at its highest point does not exceed 450 feet. The soil on the plateau is a red, and in places a yellowish, marl. On the large Government plantation of Marseilles, this red marl extends to a depth of 40 feet, followed by 11 feet of red and white sand and then 26 feet of a yellowish marl. Where not exposed to wind, the red marl is the soil on which clove trees do best; but there must be plenty of depth, as the clove has a tap-root system of growth. Pemba presents similar features, but the proportion of land suitable for cultivation is much larger than in Zanzibar. The island consists of a series of hills and valleys affording more shelter from wind. The clove trees are grown on the hill-sides, and the plantations there are as a rule heavier bearers than those in Zanzibar—age for age.

The mean temperature on both islands is about 80° F. with a maximum and minimum in Zanzibar of 85° and 75° F., and in Pemba of 82° and 70° F. respectively. Rainfall is 60–80 inches, and the rainy seasons are well defined, the heavy rains occurring in April and May, light rains in November and December, and lighter rains in July.

THE LABOUR SITUATION.—The first class from which labour is drawn is found in the descendants of the former slaves—some actually born in slavery themselves, but the majority at the present date born in freedom. Such of these freed slaves as are left on the plantations are parasitic, satisfying the pride of the owner of the land by recalling memories of slave-stocked estates of other days. They trade on this and stand aloof from the ordinary work of the plantation, holding over the head of their former master the threat that they will leave the estate should he worry them by importunities for assistance in his labour difficulties. The next of the labouring classes is found among the

¹ Also the island of Ste Marie, off the East Coast of Madagascar, and the adjoining mainland.

aborigines of the two islands—the Wahadimu in Zanzibar and the Wapemba in Pemba. Since the abolition of slavery, these have become the chief factor in the clove harvest, and while in other seasons they retire to their villages in districts quite apart from the plantation settlements of the Arabs, it is evident that in Zanzibar, given proper treatment in the matter of wages and accommodation, and to a somewhat less extent in Pemba—where owing to the absence of means of communication the aboriginal inhabitants still maintain a greater attitude of mistrustful reserve—there is no great cause for anxiety regarding the labour supply requisite for the gathering of a large crop. Labour for cultivation of the clove plantations (as distinct from harvesting) is provided by immigrants from the mainland, who earn about Rs.18 a month on piece work.

Pickers receive 5 pice per pishi ($6\frac{1}{2}$ lb.) at the beginning of the harvest and 12 to 14 pice as the harvest advances and there is more need of their services. Rice allowances are also sometimes provided. The average earnings during two-thirds of the harvesting period amount to at least Rs.1 to Rs.1½ per diem, while good pickers on the Government plantations have been known to earn over Rs.3. Frequently the labour position is eased by the difference in the period of ripening in the two islands; thus during 1922–23 the bulk of the cloves in Zanzibar were not ripe until December, and it was therefore possible to move some 14,000 to 15,000 Zanzibar pickers to the other island between October and December, these returning to take part in the Zanzibar harvest.

The harvest may commence as early as July and continue as late as March. Seasonal yields are, therefore, calculated from July of one year to June 30th of the next. The seasonal yields fluctuate enormously, sometimes 300 or 400 per cent, bad years following good ones, but the average annual export for calendar years remains about the same owing to the compensating effect of six months on and off. The crop of the 1921–22 season was a poor one, amounting to 266,801 frasilas of 35 lb. (of which 200,982 frasilas were from Pemba), but that of 1922–23 created a record, deliveries amounting to nearly 1,000,000 frasilas. The average quantity delivered to the Customs during the ten seasons ending 30th June, 1922, was 495,408 frasilas.

The seasonal yield of clove stems, which also form a considerable article of local production, shows similar fluctuations, and in recent years has been

	1918–19	1919–20	1920–21	1921–22
Frasilas	12,366	107,405	64,210	87,680
Percentage of stems to cloves	1½ %	41 %	11½ %	33 %

In a large crop year, or when cloves have to be harvested in times of rain, the percentage of stems to cloves is less, as the energies of the owner have to be directed towards getting in the more valuable portion of his crops. During 1922–23, for example, though statistics are lacking, it is known that many had to throw the stems away, but, even so, at the end of that crop year there were large accumulations of unsold stems of previous harvests on all plantations, government and private, alike.

EXPORT TRADE IN CLOVES AND CLOVE STEMS.—The following is a statement

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showing the exports (domestic) of cloves and clove stems from the Zanzibar Protectorate during the year 1922, distinguishing the countries of destination.

CLOVES :	1922	
	Cwt.	£
To Mauritius	96	" 273
„ Holland	751	2,320
„ Spain	617	1,739
„ Ceylon	19	64
„ India	80,224	357,520
„ United States	37,580	130,672
„ Italy	2,924	10,097
„ United Kingdom	36,808	154,199
„ Union of South Africa	608	2,534
„ Germany	3,605	12,223
„ France	12,456	39,656
„ China	1,668	6,720
„ Egypt	3,112	11,733
„ Gibraltar	96	488
„ Tripoli	141	570
„ Kenya Colony	54	270
„ Australia	1,761	6,967
„ Tanganyika Territory	35	144
„ Aden	1,601	7,770
„ Italian Somaliland	143	716
„ Arabia	13	72
„ Japan	1,240	4,683
„ Federated Malay States	346	1,674
„ Austria	361	1,204
„ Portuguese East Africa	2	8
„ Nigeria	50	128
„ Belgium	250	640
„ Malta	63	186
Total Exports	186,624	764,270

CLOVE STEMS :

To Italy	191	175
„ Aden	237	236
„ United Kingdom	4,566	4,891
„ Germany	11,220	12,278
„ Seychelles	400	619
„ India	5,048	5,251
„ Holland	673	429
„ China	103	74
„ Japan	40	29
„ Italian Somaliland	13	8
Total Exports	22,491	23,990

PRICES.—The following is the record of average local prices of cloves in rupees per frasilas of 35 lb. during five recent (calendar) years :—

	1918	1919	1920	1921	1922
Zanzibar Cloves	21·77	20·76	24·46	22·77	22·87
Pemba „	20·43	18·72	23·52	19·46	21·40
Stems .• .	0·80	1·82	2·52	4·17	5·57

Though the average for 1922 was good, at the end of that year Zanzibar cloves, on the prospects of a large crop, had reached the very low figure of Rs.9·00 (stems, Rs.2·90), but a rapid recovery was made during 1923 (p. 238).

In the pre-War year, 1913, the average was Rs.14 for both Zanzibar and Pemba cloves. Generally speaking the average for Pemba cloves is slightly below Zanzibar, but there are one or two plantations in the former island which owing to careful methods of preparation produce a better article than any Zanzibar can offer.

The following shows comparative prices of Zanzibar and other cloves in pence per lb. in London and Zanzibar at several dates during 1922, and is furnished as an indication of their relative standing in the market :—

1922	Penang.	Amboyna.	Mada-gascar.	Zanzibar.	Zanzibar Prices.		
					Zanzibar.	Pemba.	Stems.
January . .	26·00	21·00	16·00	18·00	13·54	13·53	3·57
April . .	26·00	21·00	16·50	13·50	11·60	11·37	2·60
July . .	26·00	21·00	16·00	13·50	11·00	9·60	2·86
October . .	27·00	21·00	16·00	16·00	7·66	6·86	1·80

It will of course be realised that October prices in Zanzibar (for example) are not strictly comparable with October prices in London, and that the Zanzibar and Pemba crop is more effected by market fluctuations (including those brought about by its own variability) than the smaller crops from Penang, etc.

CENSUS OF CLOVE TREES.—A census of the clove trees, plantations, etc., taken during 1922 under the provisions of the Agricultural Returns Decree showed that there were 1,184,430 bearing clove trees in Zanzibar Island, and 1,947,937 in Pemba.¹ Of the total of 3,132,367 the Zanzibar Government owned 131,414. In addition there were 177,560 young trees on private plantations and 23,979 young trees on Government plantations. The returns showed the number of other separate plantations to be 32,535, which were the property of 18,280 different owners.

Seven-tenths of the bearing acreage in Zanzibar is owned by Arabs, and between a fifth and a quarter by Swahilis, the balance being divided among Indians, etc. In Pemba, on the other hand, Swahilis and Arabs have about equal interest in the industry, owning between them 1,784,700 but of 1,926,048 bearing trees in private ownerships.

GOVERNMENT PLANTATIONS.—The properties now known as the Government plantations were purchased at various times out of the revenues of the country. They passed from Sultan to Sultan, each in turn making use of them during his lifetime and enjoying the income derived from them. On the death

¹ These statistics are believed to be incomplete.

of Seyyid Ali it was decided that all Crown properties should pass under the control of the First Minister of the Zanzibar Government and that the plantations should be placed in charge of the Director of Agriculture and the revenue derived from them paid into the Treasury. At the time of transfer in 1902 they were described as being forest of wild guava in some cases, and in others, seas of tangled creeping growth with trees peeping out here and there. Since 1888 scarcely a hoe had been put near the trees, fire had eaten into them every year, and after fourteen years' neglect it was a matter of surprise that there were any clove trees left to weed. The income derived from these properties in the year prior to their transfer nevertheless amounted approximately to a lakh of rupees.

The Government plantations have occupied a position on the horizon of agriculture far exceeding their relative importance. The number of clove trees represent not more than from 3 to 4 per cent of the total number of trees on private plantations. There is a general feeling that the Government should retire from a position which involves competition with private owners, and, as a matter of fact, the Government have for some years past been watching for an opportunity to dispose of them, the principal difficulty being to find parties who could be trusted not only to maintain them in their present state of cultivation, but also to improve and regenerate them.

STEPS TO IMPROVE OUTPUT AND CULTIVATION.—It is interesting to note that the Zanzibar Government have recently taken certain steps for the protection of their virtual monopoly in this product. The steps include a change in the incidence of the 25 per cent export duty in kind, whereby 5 per cent, or one-fifth of the duty, is now returnable to the actual grower as a bonus upon the number of trees cultivated. (The duty in the case of clove stems is 10 per cent.) The reason of this novel arrangement is that the duty in kind is collected from the growers, who are mainly smallholders, when the crop is brought into the town, and as the charge is thus rather an octroi than a duty proper; the smallholder is entirely in the hands of the middleman, and any direct remission of duty would simply benefit the middleman and not the actual grower.

In past years it has been the practice for Government to grant loans free of interest to plantation owners in Pemba to assist them in harvesting their clove crops. This concession was extended in 1922 to those in Zanzibar Island. Rs.43,960 was advanced in Zanzibar and Rs.52,448 in Pemba. Another beneficial reform is the licensing of dealers, and stringent measures have also been instituted for the cleaning of plantations and for their protection from insect and parasite attacks, while wilful damage to clove trees has been made punishable. A bonus of Rs.2 is now paid by the Government for each new tree planted, and large nurseries have been established to supply young trees free to plantation owners; during 1922 over 30,000 young trees were thus distributed and the demand was considerably in excess of the supply, which for 1923 was increased to about 100,000 trees. This scheme, although fairly generous to the planters, is not unduly so when it is understood that for the first ten years they cannot expect any return from their trees sufficient to pay weeding costs—not to speak of interest on capital.

The adoption of these various measures may be taken as an indication that the Zanzibar Government is now fully alive to the necessity of preserving and assisting the clove industry of the two islands. A special Government Commission of Enquiry also sat during 1923, and has since delivered its report.

REPORT OF THE COMMISSION OF AGRICULTURE.—This consists of Majority and Minority Reports, the former signed by four out of five members of the Commission, and the latter by the Chairman of the Commission; both are extremely interesting documents. The main finding with which the Majority Report starts is that in the case of privately owned clove plantations the owner is generally supine, and the estates are seriously affected with disease; there are no new plantings approaching bearing stage, and two age-classes only are represented on a scale worthy of consideration (one class in Pemba and one in Zanzibar), both of which are past the maximum economic age-limit, which the Commission fixes at sixty years in the absence of yield tables on the data of which alone accurate statements can be founded. The causes contributory to this unhappy state of matters are carefully examined. It is said that the inability of the Arab to accommodate himself to the conditions of plantation management with free labour is one important cause, while the poverty of the Arab land-owning class, their indebtedness, and the inability of the plantation owner to reap in full the profits of his plantation, which he has now to divide between his Indian creditor and the middleman, leaving but a small proportion for himself, are also adduced.

The verdict with which the Majority Report commences may appear surprising in view of the fact that a record crop was harvested for 1922-23, but no one interested in the Zanzibar clove industry disputes its truth. A regeneration policy framed by the late Director of Agriculture has been before the Government for some years, and the Commission's recommendation is that it should be made the official policy. His suggestion was that in each ten-year period for the next sixty years, that is in six successive periods, the Government should endeavour to get planted 8,000 acres—equivalent to 800 acres a year. The present area under cloves being about 40,000 acres, this would reconstitute the entire industry within the above-named period. Such a policy in the opinion of the Commission cannot be carried out except under the supervision of trained and qualified Europeans; hence the recommendation to increase the Agricultural Staff by the addition of an assistant mycologist, economic botanist, two inspectors of plantations, two plantation managers, and two plant nursery superintendents, at a commencing charge of £3,300 per annum.

In the second place, it cannot be carried out unless the plantation owner is assured of a return on the capital to be invested equal to the return from undertakings providing similar security.

The Commission here declares its belief that the increased use of clove oil for scientific purposes and its use in manufacturing processes point to the full extent of the world's demand not having yet been reached. Production, it is thought, might be considerably increased without risk of reducing prices below an economical level. It is also stated that the possible dangers include outside competition, cyclones, and diseases. From the first two the Commission

think there is little to fear and, sooner or later, a remedy is found for the worst disease. Hence the security for new capital invested in a clove plantation is believed to be good, *under normal conditions*, and it is the object of the Commission's main recommendations to recreate such conditions. The steps proposed include :—

1. That systematic clove replanting be demonstrated and encouraged, and the bonus for replanting and the plantation bonus be continued for a period of five years when stock should be taken of the results.
2. That loans for harvesting expenses and loans for general purposes be continued and extended, and that loans for plantation improvements be instituted.
3. That the clove duties should not be reduced, but should be collected on exportation at specific rates.
4. That diseased clove trees be destroyed and that diseases be further investigated.
5. That a series of roads be built in Pemba to serve the principal ports.
6. That Inter-island communications be improved.
7. That Land Bank and Co-operative schemes be deferred until conditions become more favourable to these institutions.
8. That five experimental stations be established, and that the remainder of the Government plantations be disposed of.
9. That Agricultural instruction be given at the experimental stations and that district schools be established.
10. That the staff of the Agricultural Department be increased.
11. That alienation of agricultural land be restricted.
12. That experiments be undertaken in the distillation of clove oil from stems.
13. That measures for the Standardisation of Produce should not be undertaken at present, but that legislation be introduced to prevent adulteration of produce.

In connection with the recommendation to continue and extend the present system of loans from the Government it is also suggested that additional warehouses be built to accommodate the "carry-over" of the crops and save growers from the necessity of disposing of their produce at once in order to obtain funds to continue harvesting. At present Government loans for general agricultural purposes are granted free of interest against Customs warrants issued on cloves warehoused under a free storage scheme, and with extension of the facilities larger loans could be made on safe security.

The recommendation against the reduction of the export duty is justified in the report on the ground that as a matter of assistance to the growers any reduction would be useless, since it would be passed on to the buyers and not to the sellers. The sole signatory to the Minority Report takes an opposite point of view; and cites the arguments for the reduction of the duty. It is proposed to model the suggested restrictions on the alienation of land on legislation already existing in the Punjab, which prevents the transfer of land from the agricultural to the non-agricultural classes (meaning principally money-lenders).

With regard to the distillation locally of oil from cloves, the Commission does not recommend that any steps be taken to encourage this. The clove crop is small in bulk and it is unlikely that the saving in the cost of freight would be

sufficient to make the experiment a financial success. On the other hand, a definite though not very strongly worded recommendation is made that experiments be undertaken with a view to demonstrate to owners the profit which can be obtained from the distillation of oil from stems, "mother of cloves," and cloves which have fallen from the trees ("pete"), and to indicate how the existing wastage may be avoided. The wastage referred to consists principally of large quantities of stems which under present conditions are allowed to rot in seasons of plenty (p. 261).

The British clove oil trade is of old standing and considerable dimensions. Not only this trade but the trade practically of the whole of Europe is largely controlled by five British firms acting in concert and under the leadership of the Association of British Chemical Manufacturers. The firms are members of Group VI of the Association, and it is to them that all matters affecting essential oils are invariably referred. Group VI have in recent years gained control of the bulk of the trade and are a powerful combination. It is unlikely, therefore, that they would brook competition from distillers working in independence. There are, moreover, large customers—it has been stated that they absorb 40,000 to 50,000 bales a year—with whom it is obviously in the interest of the Protectorate to work in harmony.

DISEASES ATTACKING CLOVE TREES.—Since the appointment of a Government mycologist some three years ago the disease problem has received careful study. The combined action of disease, a prolonged drought which occurred in the early part of 1922, and unsuitable cultivation is responsible for the loss of many trees in recent years. The mycologist's investigations have resulted in the demonstration of two diseases which are responsible for most of the deaths, the remainder being due to the attacks of animals or to unsuitable conditions. The two diseases are due to fungi; in one case the root is destroyed and in the other the leaf. The first of these is the most important and is a root-rot disease causing the symptoms known locally as "sudden death"; the second is more widely spread, but much less virulent, but it causes the twigs to become bare and is usually spoken of as "die-back."

The fungus which causes this disease is found in the soil, where it lives saprophytically on decaying twigs and roots and under certain conditions it is able to attack living clove roots. Having once obtained an entrance into the small fibrous clove roots, it grows from cell to cell, gradually destroying the smaller roots and spreading into the thick roots and base of the trunk. When the fibrous roots, which absorb water from the ground, have been destroyed, the whole tree wilts and dies; if only a few roots are destroyed, one branch only may be killed. The mycelium of the fungus forms a layer under the bark, and as the wood dries up fruits and spores are produced near the surface of the soil where air is fairly abundant.

The disease is very infectious and is spread chiefly by the contact of diseased and healthy roots, the fungus spreading from one to another; it is also propagated by the spores which are carried by ants and other insects. Trees growing in badly cultivated soil are very liable to the disease.

"Die-back" disease of the twigs is very common on trees growing in

exposed positions. It is due to a wind-borne fungus, which enters the leaves through the stomates, causing them to fall. The fungus is only able to enter those leaves whose surface is roughened by the presence of the *alga cephateuros mycordea*—an epiphyte on the clove. Both fungus and alga can be destroyed by spraying with Bordeaux mixture; careful pruning and good cultivation also check the disease.

CHILLIES.—The export trade in Zanzibar chillies appears to be reviving, shipments in 1922 having amounted to 79,079 lb. (valued at Rs.46,322) against 48,432 lb. (valued at Rs.32,316) in the previous year and a smaller amount in 1920. In 1913 the export was 76,514 lb., but for the period prior to 1906 an average of over 400,000 lb. was exported annually. The quality of Zanzibar chillies when properly prepared for the market—which is not always the case—is extremely good, and in strength and palatability they are esteemed superior to the Japanese, though not so bright in colour. The comparative neglect into which this cultivation has fallen is probably to be ascribed to the competition of clove-growing. An export duty of 10 per cent is levied.

3 (f). THE SPICE TRADE OF BRITISH EAST AND WEST AFRICA

(CHILLIES AND GINGER)

SPICES IN KENYA AND UGANDA.—The export trade in chillies from Kenya and Uganda received a considerable impetus in September, 1922, when the export duty on this product was taken off.

The chillies are mainly produced in Uganda, where the chillie is indigenous. This native chilli bears a small pod of great pungency. It grows in large quantities in a semi-wild state in the Busoga district, where practically all the exports originate, and is exported via Kenya; hence, owing to delays *en route*, the exports shown in the following table which gives the distribution from Kenya in 1922 are actually considerably short of the exports from Uganda (11,935 cwt., value £52,768) in the same year.

EXPORTS OF CHILLIES FROM KENYA AND UGANDA

	Cwt.	£
To United Kingdom	1,619	8,694
„ Egypt	3,279	15,101
„ Italy	1,253	5,499
„ U.S.A.	2,034	7,723
„ France	886	4,243
„ India	98	547
„ Zanzibar	108	599
„ Australia	123	561
„ Austria	51	262
„ Other Countries	137	722
Total	9,588	43,951

This compares with 7205 cwt., value £8247, in 1913-14. The shipments

have been as high as 13,300 cwt. in some years. An exotic chilli has been introduced, but is grown only to a small extent.

SPICE INDUSTRY OF SIERRA LEONE.—The spice export trade of Sierra Leone is practically confined to shipments of ginger and chillies. The former is the more important product and the distribution of exports in 1922 is shown below :—

EXPORTS OF GINGER FROM SIERRA LEONE IN 1922

	Cwt.	£
To United Kingdom	18,387	25,129
„ U.S.A.	8,025	10,798
„ Gambia	131	101
„ Other Countries	62	60
Total	26,605	36,088

This compares with 11,200 cwt. in 1921 (value £12,695) and 40,949 cwt. in 1913 (value £35,468).

The average price in 1922 was considerably in advance of 1921 quotations—hence the increased shipments. Ginger is no doubt a product capable of some development in Sierra Leone, but absence of steadiness in home markets is largely responsible for lack of interest in its cultivation. The root requires great care in preparation for export and should be thoroughly dried.

Sierra Leone ginger unfortunately is frequently badly prepared, and for this reason fetches a lower price than it would otherwise do in European markets in comparison with other grades. It is often put on the market improperly peeled, poorly cleaned and badly bleached. The need for thorough peeling should be emphasised. The skin is frequently not removed from between the “toes,” and this greatly detracts from its appearance and market value. It is interesting to learn that the Sierra Leone Commissioner of Lands and Forests is making arrangements for comparative experiments with the different commercial grades of ginger grown in other countries, in order to secure the establishment of the cultivation in Sierra Leone of the true export varieties.

CHILLIES IN SIERRA LEONE.—As regards chillies, the exports in 1922 were as follows :—

	Bushels	£
To United Kingdom	6,708	5,987
„ U.S.A.	2,894	3,045
„ Gambia	305	359
„ Other Countries	40	40
Total	9,947	9,431

The above quantity of bushels is equal to 278,516 lb. (or 2487 cwt.) and compares with only 67,200 lb. in 1921 (value £2163) and 174 cwt. in 1913.

THE SPICE EXPORTS OF NIGERIA.—Nigeria shipped 3074 cwt. of capsicums (chillies) valued at £4106 in 1922, all being destined for the United Kingdom. This is probably a trade that could be developed if there were suitable encouragement. A little ginger—120 cwt., value £148, in 1922—is sometimes also exported.

3 (g). SPICES IN THE BRITISH WEST INDIES

The spice industry of the British West Indies is confined to the production of pimento and ginger in Jamaica, and mace and nutmegs, with a very little ginger, in Grenada. The exports of pimento from Jamaica in recent years have been (1919) 117,183 cwt., £184,564; (1920) 67,569 cwt., £105,858; (1921) 80,492 cwt., £44,272; (1922) 105,036 cwt.; (1923) 84,100 cwt. The distribution of shipments in 1921 was:—

EXPORTS OF PIMENTO FROM JAMAICA

	Cwt.	£
To United Kingdom	2,911	1,601
„ Australia	1,292	711
„ Canada	1,852	1,019
„ New Zealand	154	85
„ U.S.A.	28,511	15,681
„ Austria	646	355
„ Belgium	445	245
„ France	1,672	920
„ Germany	36,374	20,006
„ Holland	3,814	2,098
„ Italy	277	152
„ Panama	594	327
„ Syria	1,950	1,072
Total	80,492	44,272

This spice is but little used in British countries. Apart from the production of pimento oil from the berries researches have recently been carried out on the preparation of oil from pimento leaves and the manufacture of eugenol, iso-eugenol and vanillin therefrom. The yield of oil and content of eugenol have been found to vary considerably with the season of the year and the source of the pimento leaves. Experimental shipments of pimento leaf oil have been made from the Government Laboratory, and sales effected in London and New York at 10s. per lb. in 1921 and 5s. 6d. per lb. at the end of 1922. An organised effort is being made to explore thoroughly the possibilities of the new industry.

The latest detailed statistics available regarding the exports of ginger from Jamaica are those of 1921, which show:—

EXPORTS OF DRY GINGER FROM JAMAICA

	Cwt.	£
To United Kingdom	2,577	13,207
„ Australia	72	369
„ Bahamas	1	5
„ Canada	1,900	9,738
„ U.S.A.	6,932	35,526
„ France	222	1,138
„ Germany	657	3,367
Total	12,361	63,550

The quantity exported in 1922 was 13,674 cwt., and in 1923 17,530 cwt.

SPICE AND TOBACCO INDUSTRIES

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FREIGHT RATES.—The freight rate from Kingston, Jamaica, to the United Kingdom is 55s. per ton (weight) for pimento, and 80s. per ton (weight) for ginger. From the outposts of Jamaica, 10s. per ton additional.

NUTMEGS AND MACE.—The nutmeg and mace industry of Grenada is fortunately in a healthy state and exports are increasing. The shipments in 1922 were :—

	Nutmegs		Mace	
	Cwt.	£	Cwt.	£
To United Kingdom	3,961	9,651	1,463	8,177
„ Canada	1,278	3,341	157	637
„ U.S.A.	17,295	46,952	1,565	8,251
„ Demerara	8	15	—	—
Total	22,542	59,959	3,186	17,066
Comparison, 1921	18,023	34,007	2,897	12,915
Comparison, 1913	14,556	25,205	2,397	18,939

Exports of ginger from Grenada amounted to only 800 lb., value £34, in 1922 (1921, 328 lb.). The present (January, 1924) freight rate on mace and nutmegs from Grenada to United Kingdom is 75s. per 40 cubic feet.

CHAPTER II

TOBACCO GROWING IN THE EMPIRE

- (1) GENERAL STATISTICAL SURVEY. (2) GEOGRAPHICAL SURVEY
(3) FINAL REMARKS

Tobacco Growing in Great Britain and Ireland. Tobacco in India: Area and Yield. Trade Varieties. Exports of Unmanufactured Tobacco. Unit of Sale and Shipment. Manufactured Tobacco. Tobacco in Ceylon: Acreage under Tobacco. Dumbura Tobacco. Jaffna Tobacco. Harvesting and Curing of "Tattayan." Marketing of Tattayan Tobacco. Harvesting and Curing of Naramban Tobacco for the Travancore Market. Marketing, Trading and Export of Naramban Tobacco. Cost of Cultivation and Curing (Jaffna Tobacco). Yields of Cured Leaves per Acre. Exports of Ceylon Tobacco. White Burley Tobacco. Tobacco in British Malaya. Tobacco in British North Borneo: The Tobacco Boom. Features of Cultivation. Production and Acreage. Exports of Tobacco from British North Borneo. Tobacco in Papua and the Territory of New Guinea. Tobacco in Australia. South African Tobacco-growing Industry: Turkish Tobacco. Virginian Tobacco. Tobacco Farmers' Co-operative Societies. South African Consumption of Tobacco. Tobacco in Southern Rhodesia. Acreage and Yield of Tobacco. Exports. Labour Supply. Agricultural Department. Disposal of Crop. Tobacco in Northern Rhodesia. Tobacco in Nyasaland. The Canadian Tobacco-growing Industry: Acreage under Tobacco and Production in 1922. Cultivation and Yield. Value of Crop. The Cost of Growing Tobacco in Ontario. Land for Extending Tobacco Cultivation. Transport Facilities. Labour. Service of Technical Information. Handling and Grading. Home Consumption of Canadian-grown Tobacco. Final Remarks.

1. GENERAL SURVEY

TOBACCO-GROWING in the Empire is not a subject that lends itself to general survey inasmuch as the majority of the tobacco-growing countries specialise

in producing for the needs of their local market, while the conditions under which the industry is carried on, and the types of tobacco produced, vary widely.

India, for example, with nearly a million acres under tobacco, produces mainly for the needs of her own home market; South African tobacco is still principally an article of local consumption; and Canadian tobacco, though beginning to find an overseas market, is also principally consumed at home.

British North Borneo, with its output of cigar-wrapper tobacco, is a case apart.

So far as shipment to Great Britain is concerned the only part of the Empire taking even moderately high rank is Nyasaland. India, however, ships somewhat extensively to a number of other markets, and Southern Rhodesia has an export trade to the Union of South Africa, besides sending a little to this country.

The following table, based on the returns available, gives the approximate position of the various producing countries:—

TOBACCO IN THE BRITISH EMPIRE

	Acreage under Tobacco.		Production and/or exports of Home-grown Tobacco.	
	1913	1922	1913 lb.	1922 lb.
Great Britain and Ireland . . .	148	51 ⁽¹⁾	P. 139,226	P. 20,715
British India	1,001,710	932,482	P. No return	P. No return
Ceylon	12,986	12,709	E. 27,817,000	E. 19,116,119
British N. Borneo Exports of			E. 4,273,188	E. 4,334,595
Estate-grown	—	1,465	E. 20,288 (bales)	P. 1,208,133
Australia	3,007	1,345 ⁽²⁾	P. 2,827,552	P. 408,912 ⁽³⁾
Canada	11,000	25,762	P. 12,500,000	P. 867,888 ⁽⁴⁾
Union of South Africa . . .	19365 ⁽⁵⁾	26,000	No returns	P. 25,947,570
Southern Rhodesia	5,000	10,174	P. 3,000,000	P. 13,000,000
Northern Rhodesia	—	2,747	—	P. 3,190,359
Nyasaland	9,534	14,218	E. 3,841,600	E. 2,260,768
				P. 821,185
				E. 6,320,808

The special features of the industry in each country are reviewed in the Geographical Survey.

TASTE ALREADY FORMED FOR AMERICAN TOBACCOS.—The main difficulty

¹ Ireland only.

² Figure of 1920-21. Later figures for some States given in text.

³ Victoria, 1922-23.

⁴ New South Wales, 1920-21.

⁵ Figures for 1911 census year.

in establishing both export and home markets for Imperial-grown Virginian tobacco is to be found, of course, in the fact that the smoking palate of the British people has been formed on American tobaccos. Tobacco manufacturers, and especially cigarette manufacturers, cannot be blamed if they cater for the demand which has been created. At present most of the Empire-grown tobacco consumed in this country is used in blends. A hopeful feature is mentioned by Messrs. Edwards, Goodwin and Co., the Liverpool tobacco brokers, in their annual report for 1923. The firm writes: "From a general standpoint the character of the tobacco being used is gradually changing from the heavy-bodied, strong kind to a milder form of pipe tobacco; though the cigarette habit is obtaining a still more pronounced hold on both the rising and middle-aged generation, which importers of the raw article have to allow for in arranging for supplies. As tracts of the Empire can produce a type of tobacco to compete with the United States, many of our manufacturers are using a larger proportion of these growths to secure a blend to meet the altering taste. The last crop of Brights in the Carolinas is mostly deficient in the qualities suitable for manufacturing here, and the Western is proving to be of poor character."

In this connection the prices obtained in recent years for Nyasa and Rhodesian tobaccos and those for American tobaccos may be quoted:—

PRICES IN PENCE PER LB.

NYASA AND RHODESIAN				U.S.A.			
LEAF				LEAF			
	1922	1923			1922	1923	
Dark		13-18	Virginia Dark—				
Semi-Dark to Semi-Bright .	10-16	11-18	Filler		—	12	
Medium Bright	17-19	19-22	Medium		18	18	
Good to Fine	20-28	23-28	Good to Fine		—	24	
			Virginia and Carolina Bright—				
			Semi-Dark to Semi-Bright		9-14	8-15	
			Medium Bright		15-24	16-24	
			Good to Fine		25-42	25-42	
STRIPS				STRIPS			
Dark	—	16-24	Virginia Dark—				
Semi-Dark to Semi-Bright .	14-24	16-24	Filler		13-20	13-18	
Medium Bright	20-25	22-26	Medium		21-28	20-28	
Good to Fine	26-30	—	Good to Fine		30-36	30-36	
			Virginia and Carolina Bright—				
			Semi-Dark to Semi-Bright		11-20	11-20	
			Medium Bright		21-27	21-27	
			Good to Fine		28	28	

UNITED KINGDOM IMPORTS OF EMPIRE-GROWN AND U.S.A. TOBACCO.—
The total imports of unmanufactured tobacco into the United Kingdom during the pre-War year and in 1922 were as follows:—

BY QUANTITY

	1913 lb.	1922 lb.
STRIPPED OR STEMMED . . .	48,931,510	44,155,912
Of which from U.S.A. . . .	46,483,399	41,755,515
From all Foreign Countries . .	48,449,092	41,901,245
„ British Empire	482,418	2,254,667
UNSTRIPPED OR UNSTEMMED . .	113,336,807	140,633,755
Of which from U.S.A. . . .	95,467,222	124,999,837
From all Foreign Countries . .	111,660,082	130,234,900
„ British Empire	1,676,725	10,398,840

BY VALUE

	1913 £	1922 £
STRIPPED OR STEMMED	2,181,653	4,524,616
Of which from U.S.A.	2,076,375	4,356,453
From all Foreign Countries . .	2,165,966	4,376,613
„ British Empire	15,687	148,003
UNSTRIPPED OR UNSTEMMED . .	4,526,709	12,905,074
Of which from U.S.A.	3,580,470	11,506,138
From all Foreign Countries . .	4,478,992	12,188,042
„ British Empire	47,717	717,032

These tables indicate the extraordinary extent to which American tobacco predominates in the British market. The average price, it may be mentioned, works out at 9d. per lb. in 1913 and 1s. 10d. per lb. in 1922 ; a great part of the increase is ascribed in the trade to the advent of pooling arrangements managed by the Farmers' Co-operative Associations in the U.S.A.

Details of the imports into the United Kingdom of Imperial-grown tobacco are now given ; these include both "stripped or stemmed" tobacco and "unstripped or unstemmed."

	Quantity		Value	
	1913 lb.	1922 lb.	1913 £	1922 £
Cyprus	—	46,772	—	2,880
Egypt ¹	—	30,094	—	4,680
Union of South Africa	45,175	59,387	2,260	2,439
Rhodesia	162,874	360,325	3,709	49,993
Nyasaland Protectorate	1,901,851	6,734,863	55,733	480,370
British India	6,724	3,934,573	158	132,477
'Straits Settlements and Dependencies (in- cluding Labuan)	1,530	—	205	—
British North Borneo	—	—	—	123,277
Hong-Kong	38,816	2,878	1,174	119
Canada	14	855,397	1	67,085
Other British Possessions	2,159	36,208	164	1,715

Total from British Empire . . 2,159,143 12,653,513 63,404 865,035

¹ Egypt was shown in the official returns for 1922 as a British Possession.

While the quantity of raw tobacco imported into the United Kingdom from the Empire overseas was approximately six times as great in 1922 as in 1913, its proportion to the total imports remains regrettably low, and the country continues to be dependent upon the United States for fully 90 per cent of its gross imports. The tobacco-growing industry in America, it is interesting to recall, was developed—before the American Revolution—under a system of Colonial Preference.

THE PREFERENTIAL DUTY.—The present duty on tobacco imported into Great Britain is 8s. 2d. per lb., on which is accorded a preference of one-sixth—roughly 1s. 4d. per lb.—to tobacco produced within the British Dominions. At the Imperial Economic Conference in 1923 two proposals were submitted by the Home Government. One was to stabilise the existing preference for a term of years at 1s. 4d.; the other to increase the preference to one-fourth (at present rates about 2s. per lb.). The latter suggestion was that favoured by the Conference, but it remains to be seen what action (if any) will be taken.

At present little, if any, of the reduction in duty reaches the grower; he benefits, nevertheless, through the margin of preference going to the manufacturer as a bonus for using Empire-grown tobacco.

TOBACCO CONSUMPTION IN THE UNITED KINGDOM.—The quantity of unmanufactured tobacco withdrawn from bond for the purposes of home consumption in recent years (since the introduction of the preferential rates of duty) has been :—

	At Full rate of duty. lb.	At Preferential rate. lb.	Total. lb.
1919	141,332,428	1,493,886	142,826,314
1920	133,493,895	4,203,731	137,697,626
1921	132,974,337	5,920,815	138,895,152
1922	124,820,435	7,856,680	132,677,115

These returns do not include tobacco delivered for manufacture in bond in the United Kingdom, or for the use of H.M. Navy.

TOTAL CLEARANCES FROM BOND FOR FIVE COMPLETED YEARS

	To Duty-paying Factories. lb.	To Bonded Factories, H.M. Navy, etc. lb.	Export. lb.	Total Clearances. lb.	Drawback Returns. lb.
1922	146,946,462	15,369,050	11,134,976	173,450,488	14,250,317
1921	152,237,331	11,279,653	16,332,946	179,849,930	13,319,390
1920	155,100,468	19,723,068	9,321,728	184,145,264	17,375,709
1919	161,914,975	25,400,392	9,390,082	196,705,449	19,059,434
1918	132,314,539	38,682,798	210,976	171,208,313	25,723,579

2. GEOGRAPHICAL SURVEY

2 (a). TOBACCO GROWING IN GREAT BRITAIN AND IRELAND

Tobacco growing in Great Britain and Ireland can scarcely be called an industry, since the total quantity of home-grown tobacco charged for duty was only 139,226 lb. in 1913, and 20,715 lb. in 1923. The sources are shown in the following table :—

	Grown in England lb.	Grown in Scotland lb.	Grown in Ireland lb.	Total lb.
1913	8,004	2,225	128,997	139,226
1922	12,182		19,596	31,778
1923	11,782		8,933	20,715

Lengthy reports on the subject of tobacco growing in Great Britain and tobacco in Ireland are to be found (respectively) in Cmd. 1923 (obtainable from H.M. Stationery Office, price 6d. net) and in the Interim Report on Tobacco Growing in Ireland, prepared in 1923 by the Commission on Agriculture (33 St. Stephen's Green, Dublin) set up by the Government of the Irish Free State; also in the *Journal* of the Department of Agriculture and Technical Instruction for Ireland (XXII, No. 1 and XXIII, No. 1).

2 (b). TOBACCO IN INDIA

The tobacco plant is believed to have been introduced into India by the Portuguese early in the seventeenth century. The only two species cultivated in India are *Nicotiana tobacum* in the Peninsula and the yellow-flowered *Nicotiana rustica* in Northern India. In Lower Burma and Arakan there is a considerable quantity of tobacco grown from imported Havana seed, and Government since the days of the East India Company has made repeated efforts to improve the indigenous methods of curing and manufacturing and to produce a better quality of leaf. The tobacco industry is now identified with three principal centres :—

- (1) Eastern and Northern Bengal and Bihar, with headquarters at Rangpur and Monghyr.
- (2) Southern India, particularly the districts of Coimbatore, Salem, Trichinopoly, Madura, Kistna, Godavari and Gantur, with Madras, Trichinopoly, Dindigul, Palghat and Cocanada as the chief manufacturing and trading centres; and
- (3) Lower Burma with Rangoon, Moulmein and Akyab as the principal centres.

AREA AND YIELD OF TOBACCO IN INDIA.—The crop is believed to be suited only to small holdings, as it requires considerable attention and liberal manuring. The area under tobacco in British India is 932,482 acres, of which 258,100 are in Bengal, 201,062 in Madras, 114,551 in Bombay, 117,300 in Bihar and Orissa, 74,360 in Lower Burma, 64,539 in the United Provinces, etc., and the out-turn varies according to the attention given to the crop, from 200 to as much as 3000 lb. of cured leaf per acre. Efforts to improve the yield and quality have recently culminated in the production of "Pusa Type 28," which is suitable both for cigarette-making and general cultivation. Seed of this type sufficient for about 60,000 acres was supplied to cultivators during 1922. The area under certain acclimatised varieties of Sumatra tobacco also increased considerably. Though harvesting goes on in some localities as late as June, the bulk of the crop is gathered between February and April. The leaves are dried and sorted and then stacked and allowed to ferment, different qualities of tobacco being produced by varying the degree of fermentation allowed.

TRADE VARIETIES.—The best quality of Indian tobacco on the Calcutta market is known as *Rangpur*, after the district of that name in which it is chiefly grown. *Poolah* and *bispath* are varieties of Rangpur tobacco, the latter being of inferior quality. Other trade varieties known to exporters are *golden leaf* from Gantur for cigarette making and *thindoor* and *sindine* from Burma for cheroot wrappers and fillers.

EXPORTS OF UNMANUFACTURED TOBACCO.—The bulk of the tobacco grown in India disappears in local consumption, but the export trade chiefly, from Madras and Rangoon, is of considerable value. The total value of the exports of unmanufactured tobacco in 1914 exceeded £211,800, and the quantity was 27,817,000 lb. The following table shows the value and direction of India's export trade in unmanufactured tobacco, which for the most part consists of crudely cured leaf, in three recent years :—

INDIAN EXPORTS OF MANUFACTURED TOBACCO

	1920 lb.	Quantity 1921 lb.	1922 lb.
To United Kingdom	5,011,015	2,350,518	3,253,177
„ France	1,428,950	2,181,880	—
„ Aden and Dependencies	5,429,448	5,351,291	3,758,660
„ Straits Settlements (including Labuan)	2,823,826	2,659,263	3,540,354
„ China	9,519,247	6,564,801	4,210,884
„ Other Countries	4,221,844	3,431,738	4,353,044
Total	28,425,330	22,539,491	19,116,119
Total Value	£501,238	£407,492	£411,829

A notable feature is the large quantity taken by Aden and its dependencies. Until recently Burma tobacco was used in the manufacture by the French Government of the *caporal* cigarette. Another important buyer not separately distinguished in the above table is Morocco. In 1918-19 France was by far the largest customer for Indian tobacco, with over 13,000,000 lb.

UNIT OF SALE AND SHIPMENT.—The unit of sale in Calcutta and in Bombay is the maund of 82½ lb., but in the latter market the bale of 560 lb. is also recognised. Shipment is made from the former port in bales of 400 lb. net, and from Bombay in bales of 2, 2½, and 5 cwt. each. In Rangoon sales are made per hundred viss of 360 lb., and tobacco is shipped in bales of 180 to 200 lb., bundles of 90 lb. net, or in cases weighing about 365 lb. net. In Negapatam the unit of sale is the seer of 24 tolas, and tobacco is packed for export in bundles weighing from 28 to 224 lb. About half the exports are shipped from Burma.

MANUFACTURED TOBACCO.—As regards manufactured tobacco the value of the imports has always exceeded that of the exports. The best market for “Burma” and “Trichy” cheroots is the Far East, but a limited quantity finds a sale in the United Kingdom. Indian leaf tobacco makes an excellent filler, but is generally unsuitable for wrappers, and to meet this deficiency there is a considerable import of leaf from Sumatra and Java. When the import duty on foreign leaf was enhanced a few years ago the principal factory pro-

ducing "Trichy" cigars for export was temporarily transferred to Pondicherry, but they are now manufactured at Dindigul in bond under Customs supervision. Much of the tobacco grown in the East Coast districts of Madras is shipped to Rangoon for conversion into Burma cheroots, though there is a good deal manufactured in Cocanada for export as well as local consumption.

The effect of the new preferential duties on tobacco in the United Kingdom will doubtless be to encourage the trade with this country. Since the duty is charged by weight and not by value, India, as an exporter of the relatively cheaper grades, has hitherto to pay more duty in proportion than some foreign countries. But the higher degree of preference will provide a substantial set-off, and at the same time stimulate the efforts being made to raise the quality of production.

The total export of Indian manufactured tobacco in 1913-14 amounted to 2,206,000 lb. (value £107,800); in 1922 the respective figures were 1,540,963 lb. (value £70,100), and this is about the average of recent years. The two principal customers, both in 1922 and before the War, were the Straits Settlements (710,530 lb. in 1922) and the United Kingdom (293,235 lb.).

2 (c). TOBACCO IN CEYLON

Tobacco is grown principally in the drier districts of Ceylon. The largest area under tobacco is found in the Northern Province, mainly on the peninsula. It is the most important industry of the small cultivator in the Jaffna district, and very great care is given to its cultivation and irrigation. The land is thoroughly tilled and manured, and after the tobacco crop is reaped and sown with food grains and other food products. A cultivation similar to the Jaffna system is carried on in the Batticaloa and Trincomalee districts and in parts of the North-Western Province. In the Kurunegala district tobacco is also grown to a fair extent, but here the methods of cultivation differ somewhat from the Jaffna system. In the Central Province a higher grade is grown, particularly in the Kandy and Matala districts. This type has been evolved to suit the conditions of the locality, and in favourable seasons good crops are secured.

ACREAGE UNDER TOBACCO.—The acreage under tobacco as ascertained at the Census of Production in 1921 was as follows :—

CEYLON ACREAGES UNDER TOBACCO

	Acres.
Western Province	63
Central Province	3510
• Southern Province	41
Northern Province	6636
Eastern Province	374
North-Western Province	1767
North-Central Province	311
Province of Uva	3
Province of Sabaragamuwa	4
Total	12,709

DUMBARA TOBACCO.—The finest grade of Ceylon tobacco is grown in the Central Province, especially in the Dumbara Valley. The cultivation in this district begins with the slight showers of the early months of the year, and depends for its success upon the light rains which fall in April, May, and June with the advent of the south-west monsoon. Tobacco is rarely grown in this district upon the same land in two successive years, it being customary to cultivate the land in other crops and then to allow it to lie fallow for some years before another tobacco is taken off. In very dry weather, if water is available, hand watering is resorted to. Otherwise the crop depends entirely upon rainfall for its success, and is a speculative one. Fairly satisfactory attention is given by some growers to curing and fermentation, but a finer product would be procured if greater care were given to this side of the industry. The leaves of the Dumbara tobacco burn with a good white ash, but they are too thick in texture and too unsatisfactory in flavour to be of value on the English tobacco markets. They are manufactured in the Colony into cigars, which command a ready sale and would be in greater demand if they were more uniform in quality. A large portion of the Central Province crop is sold to local manufacturers of cigars for use as wrappers for the Jaffna types. The leaves are smaller and of finer texture than the Jaffna types, and have good burning qualities.

The Dumbara types of tobacco are also grown in other districts, particularly in parts of the North-Western Province. Here the system of fermenting and curing differs somewhat, and the final product is not of such high quality as that produced in the Central Province.

JAFFNA TOBACCO.—The Jaffna types consist of two kinds :—

(1) The type of tobacco known by cultivators as “Tattayan.” This tobacco is mainly used for cigar making, but is on occasion, with slight modification of the curing process, sold in Ceylon markets for chewing purposes.

(2) The type of tobacco known by cultivators as “Naramban” and principally grown for special curing and export to the state of Travancore for chewing.

Both are large-leaved, coarse tobaccos, the chewing type being the more vigorous and coarse growth than the smoking type. In addition, there is an intermediate type known as “Kooran,” which finds a market in Ceylon for both smoking and chewing.

The cultivation of tobacco at Jaffna is an interesting study, and all visitors to this part of the Colony are filled with admiration for the strenuous and continuous work that the Jaffna cultivator puts into his tobacco fields. The lands are well ploughed and manured with cattle or sheep manure, or with green leaves, and reduced to a fine tilth. Nurseries for seedlings are well prepared, and the seedlings planted out carefully and systematically. Work begins with the north-east rains, and during the early part of the growing period the rainfall may be sufficient to maintain satisfactory growth. During the dry weather and from the end of December onwards the tobacco plants are irrigated by wells. In the middle of the growing season this irrigation has to be thoroughly carried out. It involves considerable labour, and the working of “well-sweeps”

in the early hours of the morning and during the late afternoon forms a characteristic feature of the Jaffna landscape. During the early part of the growing period thorough cultivation of the land is carried on, so as to prevent its becoming "caked," and to allow of the maximum growth for the plants. All plants, except those required for seed purposes, are topped at a height of about four feet, and when they begin to yellow they are harvested.

The treatment of the different kinds of tobacco now requires separate description.

HARVESTING AND CURING OF "TATTAYAN."—The entire plant is cut in the morning, and after being left in the sun for two or three hours is brought into the curing shed. The leaves, with the portion of the stem to which they are attached, are cut off in the evening and hung up by the stalk end in an open shed. On the third day the leaves are taken down and packed tightly into a circular pit in the ground about 3 feet 6 inches in diameter and 3 feet deep. The pit is lined with plantain leaves. The tobacco leaves are laid with the stalk ends in the centre, well trodden in, covered with palmyrah leaves, and weighted down with large stones. The tobacco is thus left to ferment for two complete days, at the end of which it is taken out, turned over, and put back in the pits for another two days. The leaves are then tied together in bundles of five by the tips, hung up in a smoke-curing shed and smoked for one night only. Coco-nut shells provide the usual fuel for smoking, but some curers hold that a better flavour can be obtained by the use of "Illupay" leaves, or the skins of palmyrah fruits. After smoking, the leaves are hung in an air curing shed till the mid-rib is thoroughly dry. They are then bulked till sold.

The desirable qualities in a Tattayan leaf are: (1) softness and flexibility, (2) flavour, (3) good burning, leaving a large quantity of white ash.

MARKETING OF "TATTAYAN" TOBACCOS.—Two systems are found:—

(1) The curing is done by the cultivator as described above and the leaves sold to a dealer by the thousand leaves. In 1923 an average price was Rs.50 per thousand leaves.

(2) The dealer values the standing crop in the field and, if his offer is accepted, he cuts, removes, and cures the crop. The dealer's object in this case is usually to continue haggling about the price till the crop has reached full maturity and harvesting can be no longer delayed, thus hoping to beat down the cultivator. In 1923 an average price for standing Tattayan tobacco was Rs.150 per thousand plants.

HARVESTING AND CURING OF "NARAMBAN" TOBACCO FOR THE TRAVANCORE MARKET.—When the plants are mature the leaves are cut off together with the section of the stem to which they are attached. They are allowed to lie in the field for three or four hours, and then brought in and heaped up near the smoke-curing shed. The heap will contain as many leaves as can be hung in the smoking-shed at one time, say about 1500. On the third day the leaves are made up into bundles of five, tied together by the tips and hung on to laths in the smoke-curing shed. The leaves are smoked for twenty-four hours. They are then rebulked for three days, and smoked again for twenty-four hours

as before. After this second smoking the leaves are examined, and those that still show a succulent mid-rib are subjected to a short further smoking. When smoking is complete the leaves are hung in an open shed till all the "veins" are thoroughly dry. The leaves, as they dry out, are removed from the shed and bulked till sold. The smoke-house is a small circular room about 10 feet in diameter, with mud walls 3 feet to 4 feet high. The interior is dug down 1 foot to 3 feet into the ground. The leaves are suspended from a "ceiling" consisting of an open framework of laths. Above this is a cadjan roof. The small interior lower leaves of this tobacco are treated separately. They are tied together in rough bundles and spread over the above-mentioned framework of laths when smoking is in progress. They thus obtain a rough smoking themselves, and serve to check the too rapid egress of smoke from the smoke-house. These leaves are then dried off in the same manner as the good leaves; such leaves are not exported to Travancore, but are sold in Ceylon for chewing, mainly in the Kandy and Gampola districts.

The desirable qualities in a good "Naramban" leaf are: (1) large size, (2) thorough dryness, (3) thickness.

MARKETING, GRADING, AND EXPORT OF "NARAMBAN" TOBACCO.—As in the case of "Tattayan," the cultivator may either sell the standing crop by the thousand plants or the cured leaves by the thousand leaves. Prices in 1923 ranged round Rs.150 per thousand standing plants, or Rs.45 to Rs.50 per thousand good, cured leaves. Tobacco for export to Travancore undergoes a very much more complicated handling process than tobacco for local consumption. When the tobacco has been cured by the cultivator and sold to a Jaffna merchant, the leaves are graded according to thickness and size on arrival at the merchant's godown. Usually seven grades are made; 4500 to 5000 leaves of the best grade will go to make up a candy of 600 lb. of tobacco, while as many as 15,000 of the lowest grade will be required. After grading, the tobacco is made up into rough bundles and weighed. It is then sprinkled with salt water and bulked for one day. There is said to be a great art in this process of sprinkling with salt water, and the source of the water is considered important. Water from the Jaffna lagoon is said to be the best, while water taken from the sea at, say, Kamkesanturai, would, it is said, spoil the tobacco. After bulking, the leaves are tied up into neat bundles. These bundles are then bulked in heaps of 1000 bundles from eighteen to twenty days. Tobacco is then made up into neat packages, weighing 75 lb., enclosed in palmyrah matting and carefully corded up with coir rope. Such a package will contain between six and seventeen bundles of leaves, according to the grade, and is known as "Cipam." The Jaffna merchant reckons that this somewhat elaborate handling and packing costs about Rs.20 per candy. Thus packed, the tobacco is shipped to the ports of Quilon or Alleppey in Travancore. There are four brokers in the former and two at the latter port, and all the Jaffna tobacco passes through their hands. These brokers sell the tobacco on commission to merchants and retailers in Travancore and advance money to the Jaffna merchants. The broker's commission ranges from Rs.10 to Rs.15 per candy according to the grade.

The 1922 crop fetched up to Rs.800 per candy for the best Jaffna tobacco, whereas its rival, the Coimbatore tobacco, fetched only about half that price.

At the present time the annual import of Jaffna tobacco is limited by the Travancore Government to 5745 candies—of which 3745 candies may be landed at Quilon and 2000 candies at Aleppey.

COST OF CULTIVATION AND CURING (JAFFNA TOBACCO).—The total cost of cultivation and curing amounts to Rs.440 per acre (figures collected by Mr. W. P. A. Cooke, Farm School Officer).

VALUE OF PRODUCE FOR 1 ACRE

	Rs.
4000 plants at 15 cents	600.00
Trash	20.00
Suckers	20.00
Stumps	8.00
Total	648.00
Less Cost of Production	440.00
Net profit	208.00

The profit will, of course, vary from year to year according to the markets. When prices are high, the profits are large. In other years expenses are barely covered, but in general the better lands will average profits of between Rs.200 and Rs.450 per acre.

YIELD OF CURED LEAVES PER ACRE.—An average yield for “Tattayan” tobacco is given as 20,000 good leaves, and 10,000 inferior leaves. The average for “Naramban” is somewhat lower, since the plants are topped lower and the inferior lower leaves are removed early and not taken into account.

EXPORTS OF CEYLON TOBACCO.—Exports of unmanufactured tobacco from Ceylon amounted to 4,273,188 lb. in 1913 (value £57,265), 2,411,419 lb. (value £40,942) in 1921, and 4,334,593 lb. in 1922. The exports of unmanufactured leaf generally go to India and the Straits Settlements.

WHITE BURLEY TOBACCO.—The Travancore markets were some eight years ago closed to Jaffna tobaccos, but were subsequently reopened to the limited extent noted above. The critical situation demanded that experiments with other types of tobacco should be undertaken. These have been carried out upon a Government Experiment Station (Jaffna), and it has been demonstrated that White Burley tobacco of good quality, capable of realising 1s. 6d. and 1s. 8d. per lb. on the London market, can be satisfactorily grown. (An interesting report on this tobacco will be found in the Imperial Institute *Bulletin*, Vol. XVI, No. 2, p. 149, etc.) While the prices for the Jaffna tobacco rule high, and there is a strong demand in India, it is unlikely that White Burley tobacco will be grown by the smaller cultivator, but several growers are now experimenting with its cultivation. Experiments are also being made with different types of cigar tobaccos at Teldeniya.

2 (d). TOBACCO IN BRITISH MALAYA

The Department of Agriculture (Federated Malay States and Straits Settlements) has recently carried out experiments on tobacco cultivation, and the conclusion has been reached that the production of this crop by natives is possible on average good soil. Tobacco used by natives in Malaya is uncured. The green leaf is cut into shreds and dried, and is then ready for smoking. Under these conditions, the production of tobacco is simple. There is a considerable demand for this type of tobacco in Malaya and the adjacent countries, and thus it would be wiser to fill this demand rather than to encourage amongst Malays the cultivation and curing of tobacco for the European market. It must be remembered that locally grown tobacco is protected by Government, as it is not liable to the import duty on tobacco.

2 (e). TOBACCO IN BRITISH NORTH BORNEO

North Borneo is held to be the only part of the British Empire, and in fact the only country in the world besides Sumatra, where cigar-wrapper tobacco of the best quality can be grown; and the area available in Sumatra is being steadily reduced, owing to the advance in rubber cultivation and the fact that cigar-wrapping tobacco companies require fully seven times the area of land that they can put into cultivation in one year. This is due to the soil-exhausting nature of the crop, which makes a seven years' rotation necessary. The large rivers of the British North Borneo Company's territory are all fringed with land which will produce leaf of the finest colour and texture.

THE TOBACCO BOOM.—The early days of tobacco planting in British North Borneo were times of golden promise, and the formation of new companies proceeded so rapidly that the development may well be described as a boom. Land in blocks of 10,000 to 40,000 acres was taken up on almost every bay and river in the country, and for a time North Borneo seemed likely to be a formidable rival to Deli. Unfortunately, however, features common to all booms were present. A large number of managers had to be found and some of them were probably incompetent. The industry was a new one and local conditions had not been thoroughly studied, and totally unsuitable land was selected in several cases. When operations were commenced they were often characterised by a lavish expenditure only commensurate with the huge profits that were expected. Under such circumstances it is not surprising that some of the companies had only a brief existence.

FEATURES OF THE CULTIVATION.—Cigar-wrapper tobacco is of all crops, perhaps, the most exacting. The soil must be rich, but not too rich, or the growth is coarse and the leaves are of a bad texture. A sandy loam gives the best quality of leaf, but a single crop impoverishes it so much that it has to be rested for about seven years before another can be planted. The best soil is found on the banks of rivers, but proximity to salt water is fatal to the quality of the tobacco, and more than one company has come to grief through planting too close to the sea. Given ideal land a crop may fail for lack of rain, and even when

soil and water conditions are both perfect the unremitting attention of an expert manager is required or the crop may be spoilt before it is ready for the market. A plague of caterpillars can play havoc with the tobacco¹; this often happened in the past, but the danger has been greatly reduced since scientific methods of control were adopted. The leaves have to be plucked singly, and they must be ripe to a day. Drying and fermentation are operations demanding extreme care, and to get the best price for a crop the leaves must be carefully sorted according to size, colour, and the part of the plant from which they came. The difficulties are many, but in a successful year the profits are good, and with experienced management the cultivation is not as speculative as might appear; one company in North Borneo worked for eleven consecutive years and only incurred a loss in one season.

PRODUCTION AND ACREAGE.—The crop record for four recent years is as follows:—

	1919	1920	1921	1922
Fields planted . . .	990	1,056	909	921
„ equal acres . . .	1,399	1,791	1,444	1,465
Crop (lb.) . . .	1,857,380	1,285,000 ¹	1,157,390	1,208,133
Prices per $\frac{1}{2}$ kilo . . .	—	(2) 2s. 8d.	(1) fl. 2.00	—
„ „ . . .	—	(1) fl. 2.25	(1) fl. 2.13	—

The figures prefixed to the prices denote the number of companies—there are three in all—to which the data refers. Quotations are usually per $\frac{1}{2}$ kilo, equal to 1.102 lb. The prospects of 1923 were said to be very good.

EXPORTS OF TOBACCO FROM BRITISH NORTH BORNEO.—The value of the exports of tobacco from British North Borneo have been as follows in recent years: 1920, £191,169; 1921, £143,171; 1922, £107,531.

2 (f). TOBACCO IN PAPUA AND THE TERRITORY OF NEW GUINEA

Papua accords a preference of 1s. 3d. per lb. on locally grown tobacco, but it has been found that the natives prefer the American tobacco to which they have become accustomed, and the cultivation, which in 1918 occupied 381 acres in the Central Province, has been abandoned.

Cigar-wrapper tobacco was cultivated with success in the Territory of New Guinea during the earlier period of its administration by the German Chartered Company (New Guinea Company), at Astrolabe Bay, on the mainland, and in the Bismarck Archipelago. Plantation managers were brought from Sumatra, but the Dutch Government, fearing competition, forbade the New Guinea Company to take skilled native labourers to their new plantations. Labourers were ultimately obtained from China and the Straits Settlements, and by 1892 there were over 1800 Malay and Chinese coolies on the mainland; but, owing to the heavy mortality, the number soon dropped to less than 1000. By 1893 there were 500 acres under tobacco, and the export reached 77 tons. Tobacco of high quality, rivalling the best Sumatra leaf, is said to have been

¹ Approximate figure.

produced. Later, the growing of tobacco on European plantations was abandoned, partly, it is said, for want of intelligent labour, although it continued to be grown for the natives for their own use ; it has not since been revived and it is difficult to see how this country could compete successfully with British North Borneo and Sumatra in their own particular field of tobacco growing. (For particulars of the present labour regime see under " Rubber," p. 97.)

2 (g). TOBACCO GROWING IN AUSTRALIA

In Australia tobacco growing is an industry which has experienced marked fluctuations. Thus, as early as the season 1888-89 the area under this crop amounted to as much as 6641 acres, of which 4833 were in New South Wales, 1685 in Victoria, and 123 in Queensland. This promise of importance was, however, not fulfilled, and after numerous fluctuations, in the course of which the Victorian area rose in 1895 to over 2000 acres, and that in Queensland to over 1000 acres, the total area for the season 1920-21 had declined to 1345 acres, distributed as follows : New South Wales, 1021 acres ; Victoria, 95 acres ; and Queensland, 228 acres. Until within the last five years—in Victoria, at any rate—the tobacco crops were grown almost entirely by Chinese, who adopted obsolete methods of growing and curing.

Within the last year or so, however, a fresh impetus has been imparted to the industry in Victoria and New South Wales, and European farmers have adopted the latest methods of growing and flue curing. Following conferences before the Australian Tariff Board, an agreement between the tobacco manufacturers and the Australian growers has been concluded, as a result of which the sun-dried tobacco industry of the Commonwealth will cease for want of a market in three years' time. The agreement, which is between the growers and the British Australian Tobacco Company, Ltd., and concerns the industry for the next three years, provides that the company will purchase a minimum of 1400 tons of flue-cured tobacco leaf as per agreements entered into with the Victorian Government with respect to 700 tons and with the New South Wales Government with respect to 700 tons. If the growers in Victoria are unable to produce 700 tons, the deficiency will, if available, be made up by purchase from other States. If in any one year there is less than 3,000,000 lb. of suitable flue-cured tobacco available the deficiency will be made good by extra purchases in the following years of the three-year period.

During the next two years £3700 will be advanced by the company towards the erection of flue barns in Australia to approved applicants. The company has undertaken to purchase from the growers who have sold their 1923 leaf to the company sun- and air-dried leaf—in 1924 an amount equal to one-third of the quantity purchased in 1923, and in 1925 an amount equal to one-quarter of that purchased by the company in 1923. The above offer only applies to present growers of sun-dried leaf, and after the 1925 season the company cannot undertake to purchase any more of that leaf. The above purchase is, of course, in addition to the 1400 tons of flue-cured.

A good quality leaf is now being produced and sold in accordance with a

guarantee furnished by the above-named company, at the following prices : Dark mahogany, 1s. 6d. ; Bright mahogany, 2s. ; and Lemon yellow, 2s. 6d. per lb.

Reviewing these prices one would naturally question why more tobacco is not grown in Australia. This is explained by the presence of a fungus disease known as Blue Mould (*Peronospora hyoscyami*), which attacks and proves destructive to the young plants in the seed beds, sometimes annihilating the prospects of the season's crop. However, experiments are being carried out for the prevention of this disease, which are giving encouraging results. Should these experiments prove successful a rapid expansion of the industry will result and Australia may be in a position to export tobacco leaf of good quality. At present, of course, there are no exports. The tobacco growers of Victoria are exhibiting tobacco leaf at the British Empire Exhibition, and samples of any season's crop may be obtained on application to the Secretary of the Tobacco Growers' Association of Victoria, Bright, Victoria.

Mr. C. J. Tregenna, the New South Wales tobacco expert, has given it as his opinion that the district in New South Wales which promises to produce the type of leaf most closely resembling that imported from America lies in the area of Tamub to Wagga and south thereof, embracing the cooler portions of the State.

The acreage planted to tobacco in Victoria in 1921-22 was 604 acres (by 200 growers, as against 95 acres in the previous year), and this gave a yield of 3600 cwt. dry tobacco. For 1922-23 the approximate figures are 660 acres, 225 growers, and 3651 cwt. dry produce.

In Western Australia tobacco growing is only at the experimental stage. The municipal gardener, Kitchener Park, Subiaco (Western Australia) has, however, demonstrated the suitability of local conditions for the cultivation of tobacco. Highly satisfactory results have been obtained from an experimental plot ; the leaf, when stripped and cured, being of an exceptionally good quality and fine aroma. The Department of Agriculture have requested that 5000 plants be raised from specially selected seed for distribution in various parts of the State.

The principal centre for tobacco in Queensland is Texas, on the Darling Downs, where in 1922 118 acres were under cultivation, producing 114,736 lb. dried leaf. Although the climate and soil of Queensland are admirably suited for the cultivation of tobacco and every effort has been made by the Government to extend the industry by the appointment of instructors, setting up plant for treating the crops, etc., the total area under tobacco is decreasing ; in 1921 it was 198 acres and in 1922 179 acres. A few years ago the area was over 1000 acres.

2 (h). THE SOUTH AFRICAN TOBACCO GROWING INDUSTRY

Tobacco growing in South Africa has been steadily increasing during the past ten years. The area under cultivation at the present time is 26,000 acres, and a variety of types are grown in the different Provinces. In the Transvaal a light and medium tobacco of the Virginian type is produced ; in the south-central part of the Cape Province a medium to heavy type Virginia is grown ; and in Natal a medium dark tobacco is grown and used in the manufacture

of cigars and a cheap grade of pipe tobacco. In the western part of the Cape Province Turkish tobacco, such as Dubeck and Soulouk, is grown. The bulk of the tobacco produced is of the light medium Virginia type. The Turkish leaf grown (amounting to 750,000 lb.) does not meet the demand.

The total production of all tobaccos grown in South Africa has been as follows: 11,644,000 lb. in 1920, 16,620,000 lb. in 1921, 13,000,000 lb. in 1922. Frost and fire caused considerable damage to the 1923 crop, which is estimated at 20 per cent below that of last year.

TURKISH TOBACCO.—The annual gross return from Turkish tobacco grown in South Africa is usually about £60 per acre, though a gross return of as much as £100 per acre is obtained by some growers. With such good returns, and a local market for twice as much Turkish tobacco as is grown, it may seem an anomaly that the crop is not more extensively taken up. The reason is that the Turkish leaf produced in South Africa is at present grown almost entirely in the south-western districts of the Cape Province, where, owing to comparatively close settlement of the land, there is considerable demand for, and consequent scarcity of, coloured farm labour; and as in those districts the orchard, vineyard, or wheat field is the farmer's main consideration, and tobacco growing generally only a side-line, the former usually have a first call on the labour supply; the tobacco crop suffers when there is a scarcity of labour, because it is a crop requiring an unusual amount of labour to handle properly.

It is, however, becoming increasingly apparent that the crop will do well in districts other than those to which it is at present confined. Its main requirement in South Africa is a winter rainfall of not less than twenty inches, and given this, it does well on almost any fairly good, light soil. To meet local demand present production will have to double. The extent to which there will then be room for further development in Turkish tobacco growing will depend, of course, on the extent to which a profitable overseas market can be captured. It is true that South African Turkish tobacco, if exported, may have to compete with the peasant-grown tobacco from Turkey and the Balkans; but even in that case, Imperial preference may give the South African article the advantage necessary. At present the price generally paid by the manufacturer to the grower of Turkish tobacco in South Africa is, on the average, 2s. 3d. per lb. for the whole crop. The average crop is about 500 lb. of cured leaf per acre, but the hard-working, competent grower, who practises the best cultural methods and has an adequate labour supply, reasonably expects results above that average, and such growers have got up to 700 lb. of leaf per acre. That is, say, 2s. per lb. means a gross return of £70 per acre; at 2s. 9d. per lb. it means £96 an acre; and instances are on record of a crop of twenty acres selling for £2000.

The cost of production may vary from 9d. to 1s. 3d. per lb.; generally it works out at about 1s.

For every ten acres of Turkish tobacco grown, two coloured labourers, at a present wage of 3s. a day, are required all the year round, for preparing the soil, transplanting, hoeing, fertilising, picking grubs, etc. For picking, sorting, threading, hanging, and baling the leaf, about twenty coloured women are

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required off and on for five months in the year, working five days a week at 1s. 9d. a day.

VIRGINIAN TOBACCO.—Unlike Turkish tobacco, which, as we have seen, is in South Africa confined to the area having a winter rainfall, Virginian tobacco is grown in the area having a summer rainfall. It is, therefore, grown over most of the country; without irrigation where the rainfall is more than twenty-two inches a year, and with irrigation in the drier regions.

The yield is from 1000 to 2000 lb. of cured leaf per acre, the leaf cured into four shades. When the tobacco is of good quality the price is generally as follows :—

Yellow leaf, from 1s. 3d. to 1s. 6d. per lb.
Light red leaf, from 10d. to 1s. per lb.
Red leaf, about 8d. per lb.
Dark leaf, from 4d. to 7d. per lb.
Bottom leaves, about 3d. per lb.

How much of each grower's crop turns out yellow leaf at 1s. 6d. per lb., and how much dark leaf at 4d., depends largely on the chances of season. As the tobacco is all air-cured, unseasonable weather may alone reduce the amount of yellow leaf to, say, 10 per cent of the whole crop, or, if the curing weather is good, the percentage of yellow leaf may be as high as 40 per cent to 60 per cent. At the same time, the cultivation has much to do with the colour the leaf will be when cured, as also has the variety of seed sown, whether a light or heavy type. Thus plenty of fertilising and rain or irrigation, which will give a yield of, say, 2000 lb. per acre, usually produces a heavy, sappy leaf, that in its nature must cure dark. So that when the percentage of yellow leaf is high, the reason partly is that the crop has been cultivated to produce a light leaf, and the yield per acre will then probably be rather 1000 than 2000 lb.

A fair estimate of the probable gross return per acre would then be somewhat as follows for a reasonably good season :—

A—TOTAL YIELD PER ACRE, 1000 LB.

	£	s.	d.
10 per cent or 100 lb. at 1s. 6d.	7	10	0
15 „ or 150 lb. at 1s.	7	10	0
25 „ or 250 lb. at 8d.	8	7	0
40 „ or 400 lb. at 6d.	10	0	0
10 „ or 100 lb. at 3d.	1	5	0
	<hr/>		
	£34	12	0

B—TOTAL YIELD PER ACRE, 2000 LB.

	£	s.	d.
5 per cent or 100 lb. at 1s. 6d.	7	10	0
10 „ or 200 lb. at 1s.	10	0	0
20 „ or 400 lb. at 8d.	13	7	0
55 „ or 1100 lb. at 6d.	27	10	0
10 „ or 200 lb. at 3d.	2	10	0
	<hr/>		
	£60	17	0

The heavier and coarser crop, therefore, sometimes pays better, and gives really a very handsome return. But—and this makes the growing of Virginian tobacco so attractive to the man of enterprise—there is always the possibility of a lucky season, when perhaps 60 per cent of the crop cures yellow on a yield of, say, 1400 lb. per acre, and the return is then £80 to £100 per acre. Then light leaf pays best.

Again, there are localities where only the dark juicy leaf is grown, which, under heavy fertilising and irrigation, yields as much as 2000 lb. of tobacco per acre. This leaf, when at some little expense to the grower it is turned into roll tobacco for chewing, in its finished state sells at about 1s. per lb., or a gross return again of about £100 per acre, at a cost for production of about £15 an acre.

Working expenses are not so heavy as for the production of Turkish tobacco, being about £12 to £15 an acre. Labour, though perhaps not so good as in the Turkish tobacco districts, is on the whole more plentiful where Virginian tobacco is grown.

For various reasons, flue-curing is not in vogue in the Union of South Africa.

The full amount of Virginia tobacco which can be consumed within South Africa is now being produced, and if the output increases oversea markets must be found.

TOBACCO FARMERS' CO-OPERATIVE SOCIETIES.—There are three tobacco co-operative societies at present in the Union. Only *bona-fide* tobacco farmers may be members. All the members share *pro rata* the profits accruing after deduction of working costs, and members are required to deliver their tobacco crops to the organisation. The largest is the Rustenburg Farmers' Co-operative Society, which handles between 3,500,000 and 4,000,000 lb. of tobacco annually.

The Western District Warehouse Association of Paarl, Cape of Good Hope, which has been in existence nine years, has been of considerable assistance to the Turkish tobacco farmers, and has succeeded in putting on the market a matured article which has much improved the position of the manufacturers of colonial Turkish cigarettes. The Association handles annually some 250,000 to 600,000 lb. of tobacco.

The Vaal River Tobacco Farmers' Company, Ltd., was inaugurated in 1918, and was converted into a co-operative company in 1921. It is estimated that 300,000 lb. of tobacco will be dealt with yearly.

SOUTH AFRICAN CONSUMPTION OF TOBACCO.—Probably the largest tobacco and cigarette manufacturers are the United Tobacco Co., Ltd., and the Westminster Tobacco Co., which are subsidiaries of the British-American Tobacco Co. of England. There are no firms, other than manufacturers, which import leaf tobacco.

The local manufacturers have been using an increasing quantity of tobacco grown in South Africa and Rhodesia, and a decreasing amount of American tobacco. For instance, in 1916 the raw tobacco consumed consisted of 8,000,000 lb. of South African and 466,020 lb. of imported tobacco. In 1920 there was used 12,500,000 lb. of South African, 1,500,000 lb. of Rhodesian, and only 211,307 lb. of imported tobacco.

In 1913 the total imports of raw tobacco into South Africa amounted to 1,033,910 lb., of which 592,654 lb. came from the United States, 306,295 lb. from Portuguese East Africa, and 106,587 lb. from Turkey. In 1921 only 217,638 lb. of raw tobacco were imported, of which 91,161 lb. came from the United States, 36,688 lb. from Portuguese East Africa, 80,989 lb. from the other British possessions in South Africa, and 1751 lb. from Turkey. During the same year 2,378,603 lb. of Rhodesian tobacco were brought into South Africa.

2 (i). TOBACCO IN SOUTHERN RHODESIA

Some 70 per cent of the area of Southern Rhodesia is believed to be highly suitable for tobacco cultivation, the soils consisting of granite sand and sandy loam. The climate is temperate at the altitude of 4000 feet, where settlement is principally established, and sub-tropical at altitudes below the 3000 feet level. Climatic conditions, except in abnormal seasons, are favourable for tobacco culture, and the crop is grown without the aid of irrigation. Unturned land can be cleared and a crop reared in one year.

ACREAGE AND YIELD OF TOBACCO.—The 1922 crop was grown on an area of 10,174 acres, and the production was 3,190,359 lb. This was an increase in acreage over 1921, but the yield, owing to lack of rain, showed a decrease. The pre-War area under cultivation (1913) was 5000 acres and the crop 3,000,000 lb. During the War very little tobacco was grown. The average yield per acre in recent years has been :—

		Virginia lb.	Turkish lb.
1920	. . .	369	280
1921	. . .	404	337
1922	. . .	308	259

Virginia tobacco accounted for 2,880,104 lb. of the 1922 production and is grown principally in the Marandellas, Hartley, Salisbury, and Mazoe Districts. Turkish tobacco is grown in the Lomagundi, Makoni, Bulawayo, and Salisbury districts, and the 1922 production was 302,255 lb.

EXPORTS OF TOBACCO FROM SOUTHERN RHODESIA.—The exports in 1922 attained a total of 2,268,768 lb. (which is about the average of recent years) and were distributed between (1) the Union of South Africa, 2,100,880 lb.; (2) United Kingdom, 144,769 lb.; (3) Northern Rhodesia, 16,019 lb.; (4) Portuguese East Africa, 6206 lb.; and (5) Belgian Congo, 894 lb. The most notable feature was the increase of the export to the United Kingdom from 33,342 lb. in 1920 and nil in 1921.

LABOUR SUPPLY.—The labour supply presents no difficulty. It is fairly cheap in Southern Rhodesia, averaging 1s. per diem per head, including cost of feeding. Nor would any great difficulty be experienced in the event of extension in the industry. A Native Labour Bureau has been established for several years for the purpose of supplying the employer in the event of a shortage.

AGRICULTURAL DEPARTMENT.—There are no scientific establishments other

than the Agricultural Department. An expert on tobacco growing is employed on the establishment. He issues technical instructions for the guidance of growers, gives advice generally and pays occasional visits to the farms.

DISPOSAL OF CROP.—The disposal of the Southern Rhodesia tobacco crop is controlled by the Rhodesia Tobacco Co-operative Society, Ltd., P.O. Box 202, Salisbury, Southern Rhodesia. The system of selling tobacco under contract has been established and still continues in force. The Society has recently entered into fresh arrangements with the principal buyers for a period of three years at a fixed price stated to be satisfactory to the growers. There are no tobacco factories of any note in Southern Rhodesia, although some individuals are engaged in making cigarettes and a limited quantity of tobacco is manufactured. This is exported mainly to the Union of South Africa and Northern Rhodesia. There is a warehouse at Salisbury where tobacco used formerly to be graded and prepared for sale annually, when the buyers from the South used to attend. Latterly the grading process has been conducted chiefly on the farms where the tobacco is also pressed and baled.

2 (j). TOBACCO IN NORTHERN RHODESIA

In Northern Rhodesia similar conditions are found for tobacco growing to those already described for Southern Rhodesia. The area under cultivation with the crop was 2747 acres in 1922 and the production amounted to 821,185 lb., principally of Virginia tobacco. This was a slight reduction on 1921, but the crop has not varied much in recent years. The average yield per acre works out as follows :—

		Virginia.	Turkish.
1920	. . . . .	330	330
1921	. . . . .	260	92
1922	. . . . .	300	250

The principal tobacco growing districts are Fort Jameson, where 800,000 lb. of Virginia tobacco is grown, and Kafue. There is ample labour—obtainable at a somewhat cheaper rate than in Southern Rhodesia. No detailed information as to exports is available. Practically the whole of the crop is bought for exportation by the United Tobacco Company, which is established in the Fort Jameson district of Northern Rhodesia. As in Southern Rhodesia there is a tobacco expert of the Agricultural Department.

2 (k). THE TOBACCO INDUSTRY IN NYASALAND

The first exports of Virginian tobacco from Nyasaland are recorded in the year 1899 when the total export amounted to 2240 lb. Until the year 1904 the tobacco found a ready market in South Africa, and no serious attempt was made to gain a footing in the London market, but a rearrangement of Customs regulations in South Africa, and the imposition of an import duty on Nyasaland tobacco, soon placed it at such a disadvantage as compared with the South

African product that for the next few years there was a temporary setback in acreage. At the instance, however, of the British Central African Company, in 1908 the Imperial Tobacco Company took an interest in the Protectorate. The result was the rapid development of the tobacco industry and an increase in the acreage, so that in 1913 10,499 acres were under cultivation and the export of the product increased to 3,763,014 lb., then nearly equal to 4 per cent of the average annual consumption of tobacco in Great Britain. During the War production decreased owing to the reservation of many tobacco plantations for foodstuffs, but the high prices paid for tobacco in 1919 and 1920 again re-established the industry, and in 1921 14,218 acres were under cultivation, and 4,963,130 lb. were exported, valued for Customs purposes at £481,519. The general slump in 1921 again caused a setback, but by this time tobacco has become fully established, and if any evidence were needed of the confidence of experts in the industry, it is found in the building of a new and up-to-date factory at Linde by the Imperial Tobacco Company. It is hardly necessary to point out that the existence in a planting community of an important company of this nature, which pays cash for the product it requires, is of inestimable value to small planters, who prefer to receive cash rather than the risk and difficulties of shipping their crops for sale in England. The exports in recent years have been :—

	lb.
1913-14	3,763,014
1921-22	4,945,169
1922-23	6,330,898

The type of Virginia tobacco produced in Nyasaland is the nearest of Colonial-grown tobaccos to the requirements of the home trade demand and the prospects of the industry are accordingly, like its tobacco, "Bright." Some practical suggestions for putting the industry on a better footing have recently been made by Mr. C. Ponsonby for the British Central Africa Company, Ltd. Mr. Ponsonby believes that little further progress will be made until a schedule is prepared giving districts, plantations, elevations, and soil, with the varieties of tobacco on each. It may be that this information will show that there are districts or belts stretching through the country producing distinct varieties of tobacco. At the present time the Brights of one district may be as unfit for cigarette tobacco as those of another are suitable. They may have a severe twang, be too quick burning, etc. No doubt the variation will be found to be due to soil or possibly elevation, but until particulars of these are published there can be no certainty. According to the above authority the time is not far distant when more manufacturers will put Nyasaland tobacco on the market as such, and in this event they will require a steady supply of similar tobacco of the same flavour and appearance, and be far more particular with regard to the district where it is grown than they are at present, when they only require a proportion as a blend.

All Nyasaland tobacco is sold on sample and therefore it does not really matter about grade marks except in a general way. It is, however, absolutely

necessary to concentrate on shipping the bales of the same grade numbered consecutively. When a manufacturer gets a lot of odd numbers he may always suggest that the eyes have been picked out. The ideal to aim at is for bales numbered, say, J.M.360/459, to contain exactly the same tobacco, and the sample to be so representative of the run that the merchant does not have to check over each individual bale, and the manufacturer knows he is getting the goods he wants. Incidentally, he is prepared to pay more under these circumstances. To arrive at this ideal, some form of pooling or co-operation would seem to be essential. Though it would have the effect of bringing together tobacco from different plantations, there is no reason why A should suffer because his tobacco forms part of a run of similar tobacco of B, C, D, and E.

2 (1). THE CANADIAN TOBACCO GROWING INDUSTRY

Tobacco is grown in Canada in two main districts known as the Ontario and the Quebec district. The Ontario district covers the southern parts of the counties situated on the north of the Lake Erie. The growing of tobacco is concentrated more especially in the two counties of Essex and Kent. The Quebec tobacco growing districts include the counties of the Two Mountains, L'Assomption, Montcalm and Berthier, north of Montreal; and Missisquoi, Rouville, and St. Hyacinthe, south of Montréal.

The above counties represent the main tobacco growing district of Quebec, those that produce most of the tobacco used for industrial purposes. There are a large number of tobacco growers scattered all over this province, most of them growing small patches of tobacco for their own use.

ACREAGE UNDER TOBACCO AND PRODUCTION IN 1922.—The acreage planted in tobacco in the two provinces in 1922 was 25,762, or more than twice the acreage of the previous year, but only about half that of 1920. Whilst Ontario increased its acreage by about one-half, that of Quebec was three times as great. The total yield from this acreage was 25,947,570 lb., about twice that of 1921 and half that of 1920. The Province of Ontario accounted for 11,031,870 lb. of the total and Quebec 14,915,700 lb. The average yield in Ontario was 1201 lb. per acre, in Quebec, 900 lb., and in all Canada, 1007 lb. The 1923 acreage has proved to be somewhat less than in 1922, and the crop, in the early stages of its growth, experienced severe deleterious conditions. With a decided improvement, however, in the latter part of the season, it is expected that a fairly average yield will be secured.

CULTIVATION AND YIELD.—Ontario White Burleys, of which the 1922 crop was about 27,000,000 lb., are mostly grown on soil located on a limestone substratum. The arable soil, however, represents a great deal of variation from extreme light sand to heavy clay loams. The sand loams are used specially for the growing of flue-cured tobacco (output 225,000 lb. in Ontario in 1922), the soil of medium texture for the growing of White Burley. Heavier-textured soils have been used in 1923 for the growing of tobacco of the Green

River type. In Quebec the same variety of soil occurs with the exception of the extreme light sandy loams.

The average yield of White Burley tobacco can be placed at 1000 to 1100 lb. per acre, for the flue-cured tobacco at 700 to 900 lb. per acre, for the snuff tobacco at approximately 1000 lb. per acre. In Quebec there is a large variety of types, from 600 lb. per acre for the Canelle and Small Havana to 1200 or 1300 lb. per acre for the Connecticut Broadleaf. The average yield for Quebec in ordinary years may be pretty close to 850 lb. per acre.

VALUE OF CROP.—The prices paid for Canadian tobacco varied, of course, considerably according to type and quality. Assuming for Ontario tobacco an average of 25c. per lb., for Quebec tobacco an average of 12c. per lb., the total value of the Canadian tobacco crop of 1922 may be placed at \$4,547,851, as compared with \$2,293,190 in 1921 and \$5,893,275 in 1920. For Ontario the estimated value is \$2,757,967, as compared with \$1,780,490, and for Quebec, \$1,789,884, as compared with \$612,700 in the previous year.

THE COST OF GROWING TOBACCO IN ONTARIO.—Careful records have been kept of the expenditure involved in producing a crop of tobacco on the Harrow Tobacco Station. The figures quoted below are extracted from the records for the crop of 1921, but labour conditions have not improved since that year and the costs set out may still be considered as about correct :—

I. COST OF PRODUCING 6 ACRES OF BURLEY TOBACCO

Fixed charges—	\$
Grower's licence	2·00
Rent of land at \$10·00 per acre	60·00
Use of machinery at \$1·50 per acre	9·00
Use of curing barn and lath at \$10 per acre	60·00
	<hr/>
	131·00
Man labour at \$0·30 per hour—	
Preparing land, planting, cultivation, spraying, curing, stripping, etc.	762·79
Horse labour at \$0·20 per hour—	
Preparing land, planting, cultivating, spraying, harvesting, hauling, etc.	125·95
Plants	38·33
Arsenate of lead	34·65
Fertiliser—	
$\frac{1}{2}$ of actual cost of fertiliser charged to other crops in the rotation	175·89
Manure—	
$\frac{1}{3}$ of actual cost of manure, in pile, charged to other crops in the rotation	54·30
	<hr/>
Total cost of growing 6 acres Burley	1,322·91
Cost per acre for growing Burley	\$220·49
Yield on above 6 acres Burley	11,643½ lb.
Cost of producing one pound Burley	\$0·1136

2. COST OF PRODUCING 4 ACRES OF FLUE-CURED TOBACCO

Fixed charges—		\$
Grower's licence		2.00
Rent of land at \$10.00 per acre		40.00
Use of machinery at \$1.50 per acre		6.00
Use of curing barn and lath per acre \$10		40.00
Man labour at \$0.30 per hour—		
Planting, cultivating, spraying, harvesting, curing, preparing land, strip- ping, etc.		763.63
Horse labour at \$0.20 per hour—		
Preparing land, cultivating, spraying, harvesting, hauling		72.46
Plants		36.74
Arsenate of lead		23.20
Wood for curing		101.40
Fertiliser—		
$\frac{1}{3}$ of actual cost of fertiliser charged to other crops in the rotation		98.28
Total cost of producing 4 acres flue-cured		1,183.71
Cost of producing 1 acre was		295.92
Total No. lb. produced on 4 acres		5,430 $\frac{1}{2}$
Cost of producing 1 lb. of flue-cured tobacco		0.218

The above figures should be considered as conservative. While the nature of the work performed on an Experiment Station may involve, in some cases, a larger expenditure than what is spent on the tobacco crop of the average farm, this is largely compensated by the high yields secured on the Harrow Tobacco Station, which are much above the average.

However, there is a very important factor which has not been considered ; it is the risk of damage which the tobacco grower is always liable to suffer through unfavourable weather conditions : hail, windstorm, frost, etc., against which there is no possible protection. Allowance for this considerably increases the cost of production of a crop of tobacco in Canada.

Reports of the Tobacco Division of the Department of Agriculture of the Dominion of Canada, 1921-22, give further information regarding the cost of production in Quebec of cigar-leaf tobacco of the binder type, which varied from 12 cents per lb. in 1921 to 8 $\frac{1}{2}$ cents in 1922. The cost of producing 1 lb. of Cuban filler tobacco in 1922 appears to have been 30 cents ; in this case had the yield been normal it would very likely have been reduced to 25 cents or even less.

LAND FOR EXTENDING TOBACCO CULTIVATION.—The area of land suitable for the growing of tobacco is limited in Quebec to that part situated south of the Laurentides lower ranges. In Ontario 50 per cent of the area in the counties of Essex, Kent and Elgin, Norfolk, Haldimand, Welland, and Lincoln could be utilised for the growing of tobacco of one or the other types, including White Burley, flue-cured tobacco and Green River. The area of land specially suitable

for the growing of flue-cured tobacco is small compared to the acreage that could be used for the heavier types. However, there is no doubt that the production of flue-cured tobacco in Ontario could be largely and rapidly extended and reach a figure from three to four times higher than at present.

There is plenty of land available for the extension of the culture of White Burley tobacco in Ontario; the same applies to the Seed leaf tobacco of Quebec.

TRANSPORT FACILITIES.—Good transportation is available from South-Western Ontario by rail to Montreal, and it may become possible to ship by water through the Great Lakes and the St. Lawrence. Overseas transportation to the United Kingdom can be obtained from Montreal or from the Atlantic Ports of Halifax and St. John.

LABOUR.—Farm labour is somewhat scarce in Canada, specially skilled labour which is required for the handling of the tobacco crop. This, however, has never proved to be an unsurmountable obstacle to the extension of the acreage devoted to the growing of tobacco.

SERVICE OF TECHNICAL INFORMATION.—The Tobacco Division of the Experimental Farms Branch of the Dominion Department of Agriculture was established some sixteen years ago with a view to supplying the tobacco growers of the Dominion with information of a technical and practical nature concerning the growing of tobacco. This division is carrying on a large amount of education and research work covering all phases of the industry, from the sowing of the seed bed to the time of the delivery of the crop to the manufacturer or to the packer.

HANDLING AND GRADING.—As a rule the tobacco is bought from the grower direct to the packer or to the manufacturer; in this case there is no arrangement for a uniform system of grading.

A Co-operative Association has been formed in Quebec, known as the Agricultural Association of the Yamaska Valley, with its headquarters at St. Cessaire, P.Q. This Association has specialised in the handling of cigar tobacco of the binder and filler types. The Canadian Tobacco Growers' Co-operative, Limited, of Kingsville, Ontario, was established three years ago and it is dealing specially with Ontario White Burley and flue-cured tobacco. Both those organisations have established a system of grading.

HOME CONSUMPTION OF CANADIAN-GROWN TOBACCO.—The following tables show respectively the Canadian Home Consumption of locally grown tobacco and the total amount of tobacco manufactured in Canada :—

AMOUNT OF CANADIAN LEAF USED IN THE MANUFACTURE
OF TOBACCO, CIGARS, AND CANADIAN TWIST DURING THE
FISCAL YEARS 1921-22 AND 1922-23

	1921-22 lb.	1922-23 lb.
Tobacco	8,095,315	9,062,319
Cigars	607,507	1,162,252
Canadian Twist	789	387

AMOUNT OF TOBACCO, CIGARS, AND CIGARETTES MANUFACTURED IN CANADA DURING THE FISCAL YEARS 1921-22
AND 1922-23

Manufactured—	1921-22	1922-23
	lb.	lb.
Tobacco	19,942,941	21,106,223
Snuff	729,072	759,399
Cigars (No.)	182,168,776	181,013,005
Cigarettes „	2,401,142,192	1,984,043,182

The conclusion to be drawn is that 43 per cent (in 1922-23) of the total quantity of leaf used in Canadian-manufactured tobacco (apart from cigars, cigarettes, and snuff) was home grown. The total imports of foreign leaf amounted to 15,559,155 lb. in 1923.

There is no reason why tobacco of foreign origin should not be replaced by British Empire tobacco as long as the quality will comply with the trade standards of the country. Canada is importing from the United States large quantities of Virginia Bright tobacco and of Burley. Those two types of tobacco are gradually being replaced by Canadian-grown leaf of a very similar character.

Empire tobacco of the Turkish type may be used in Canada. However, it is not clear how any part of the British Empire could supply the Canadian trade with anything that could compete, for the manufacture of cigars, with the Cuban fillers. There is no shade tobacco grown in Canada, the main reason for this condition of affairs being that it has not been deemed feasible to ask the high protection which is being granted to the growers of shade tobacco in the United States.

Most of the cigar leaf sold to the Canadian manufacturers when they do not have their agents located in the producing countries, is offered through agents of firms located in the United States. A single tobacco broking firm—the Gensior Company of Montreal—may, however, be mentioned.

EXPORTS OF CANADIAN-GROWN TOBACCO.—The exports of Canadian-grown tobacco have been as follows :—

EXPORTS OF CANADIAN-GROWN TOBACCO (UNMANUFACTURED)

	Twelve months ending March		
	1921	1922	1923
To United Kingdom	lb. 160,112	340,487	892,482
„ „	\$ 90,389	135,784	248,374
„ United States	lb. 26,831	12,847	10,421
„ „	\$ 34,097	5,216	6,133
„ Belgium	lb. —	84,543	175,737
„ „	\$ —	18,002	34,639
„ Other Countries	lb. 13,210	34,114	21,367
„ „	\$ 5,971	16,824	8,777
Total	lb. 200,153	471,991	1,100,007
	\$ 130,457	175,826	297,923

3. FINAL REMARKS

*Reviewing the information available on Empire-grown tobaccos it appears that the producing countries can be divided into four classes :—

(1) Those which can only hope to develop tobacco growing for their own needs and which will not even in the future be likely to grow leaf suitable for the requirements of this market to any extent, e.g. Malay States, West Africa, British Guiana, Honduras, Trinidad, Bermuda, New Zealand, etc.

(2) Those which grow special export types of tobacco for the needs of a neighbouring Empire-market, e.g. Ceylon for India.

(3) Those that may in the future develop a considerable export trade to Great Britain but so far do not produce sufficient for their own needs, e.g. Australia.

(4) Those tobacco-growing parts of the Empire which to-day supply the bulk of the imports into Great Britain of Empire-grown tobacco, e.g. Nyasaland, India, Canada, Rhodesia, and British North Borneo. South Africa, previously in Class 3, appears now to be on the point of removing into Class 4.

It is necessary for each country to realise which category it is in, and for those shippers who are already exporting to this country or who may do so some time in the future, information on the following points may be of value.

It is most important that shippers realise that the tobacco manufacturers of the United Kingdom pay a very high duty on tobacco, and that this duty is frequently paid on unnecessary moisture in tobacco. Moisture should therefore be kept down as near as possible to the Customs limit of 10 per cent, although a little latitude is given the shipper in the case of wrapper leaf.

'Tons of good leaf have been spoilt and large quantities have had to be sold at a reduced price on account of shippers not complying with this essential.

Other complaints that have been made in respect of Empire tobacco are that it is frequently not 'butted'¹ enough and sometimes contains too much sand. Rhodesia, Canada, and Nyasaland have also at times sent shipments of flue-cured tobacco not properly cured, containing greenish leaf; this is also sometimes due to harvesting too early.

Mention of these points is not meant for discouragement, for they can all easily be remedied with very little trouble; if the growers would only realise their importance right away it is a trade view that the present rate of absorption could be doubled in twelve months.

Grading, of course, is a subject in itself, but, briefly, tobacco should be graded for colour, size, and texture, it being useless putting cigarette-type leaf and heavy-textured leaf, even of the same colour, in the same bale.

It is chiefly due to the irregularities mentioned above that Empire tobacco is so seldom sold forward, and most of the imports have been, so far, either consignments or sent cash on delivery after inspection of samples.

MARKETING TOBACCO IN GREAT BRITAIN.—Tobacco arriving in Great Britain is usually in the first place warehoused at a Customs warehouse at the

¹ Butted—the thick end of the stalks cut off.

port of arrival (London, Liverpool, etc.), and samples are then drawn from the bales or hogsheads by the merchant or broker. These are sent to the prospective buyer, who usually accepts so many bales, subject to the approval of the remaining dock samples. A sale being completed, the tobacco is invoiced at Customs landing weights with an allowance of 2 per cent for tare, ties, etc., and the usual terms are two months Prompt.

If, however, the manufacturer wishes to have the tobacco transferred before the expiration of the Prompt he discounts for the unexpired period at 5 per cent per annum.

The demand is chiefly for best bright Virginia type leaf, suitable for cigarette purposes, and there is not much danger of there being an over-production of this type. Rhodesia, Nyasaland, and Canada can all grow this tobacco. Dark, heavy, fire-cured strips from Nyasaland also have a good sale. Canadian Burley no doubt has a future in this country, but colour is the first consideration. It is hoped that a good heavy "Western" type from Canada will also soon be established on this market.

Rhodesian and South African Turkish, providing that care is taken in the fermentation, no doubt have a great future.

Indian tobacco, principally coloury Madras, also dark leaf and strips from the same district, is already being used in large quantities and has better prospects still if the coloury leaf is improved in colour and the dark leaf is as dark and heavy as possible.

APPENDIX I

THE RUBBER TRADE ASSOCIATION OF LONDON

C.I.F. CONTRACT FOR U.S.A. OR CANADA

Adopted for use as from 1st September, 1923

& Co.

Produce Brokers.

LONDON,-

-192

M

We have this day by your order and for your account upon the terms of this Contract, including the Conditions endorsed hereon and the Regulations and By-Laws of The Rubber Trade Association of London, our Principals, whose solvency we guarantee,

The following PLANTATION RUBBER, in cases fit for export, viz. :

About

HEVEA BRAZILIENSIS, Standard Quality¹

at

per lb., Cost, Freight and Insurance, net shipping weights, but any loss in weight during transit exceeding 1 %, excluding theft and pilferage, to be for Seller's account. Buyer claiming for loss in weight shall furnish within 28 days of final discharge of goods at destination, a copy of landing weights, certified by sworn weigher, as customarily taken at destination named in this Contract (weights of samples to be included). Expense of weighing shall be borne by Buyer.

INSURANCE.—To be insured by Seller with particular average, including pilferage (subject to the Institute Theft, Pilferage and Non-delivery clause) and War Risk, at the price of this Contract, plus 10 %, with first class British Company or with Lloyds ; if insured otherwise Buyer may claim Banker's guarantee for Certificate or Policy. Policy to include Warehouse to Warehouse Clause as endorsed hereon.

SHIPMENT.—To be shipped during the months of by Vessel or Vessels (Steam or Motor) from to

direct, and/or indirect, with liberty to call and/or tranship at other ports, and/or via Pacific Coast Ports and thence by rail.

Bill of Lading date shall be proof of time of shipment in the absence of conclusive evidence to the contrary.

¹Other qualities are also sold on this Contract.

QUALITY.—To be usual London Standard Quality. If found inferior, and failing an amicable settlement, Buyer shall accept same with a fair allowance to be settled by Arbitration in London, unless the Arbitrators decide that the shipment is not *bona fide*, in which case Arbitrators shall fix an allowance, and Buyer shall have the option, to be exercised within five business days from receipt of the award, of rejecting the Rubber and claiming default or accepting it with the allowance.

Notice in writing of any objection on the ground of quality must be received by Seller (or his Broker) in London not later than 28 days after discharge of the goods at destination named in this Contract, and sample or samples in support of the claim shall be produced in London within eight weeks from the same date.

Samples (with labels attached signed by both representatives stating the numbers of the cases opened and giving a description of the contents) for the purposes of Arbitration shall be drawn and sealed on quay or in public warehouse at destination named in this Contract, in the presence of representatives of Buyer and Seller, and forwarded to London. If Seller does not name his representative in sufficient time, sealed samples drawn by the Buyer in conjunction with an independent party approved by the Rubber Trade Association of London shall be accepted.

DECLARATION.—Seller shall give Buyer Provisional and Final Declarations as provided in Conditions Nos. 13 and 14 endorsed hereon.

PAYMENT.—Payment shall be made in London, against delivery of shipping documents, in accordance with Conditions Nos. 15 and 16 endorsed hereon. Shipping Documents shall consist of (a) Complete set of Bills of Lading, or Bill of Lading and Banker's guarantee, if required, for any missing copies and/or Ship's Delivery Order and/or Seller's Delivery Order accompanied by Banker's guarantee, if required, and (b) Policy of Insurance and/or Certificate and/or Letter of Insurance (accompanied in the case of a Certificate and/or Letter of Insurance by Banker's guarantee, if required) and (c) Consular Invoice and/or Seller's guarantee to produce same within reasonable time, accompanied by Banker's guarantee, if required, and (d) Weight Note or Seller's guarantee to produce same within reasonable time. No responsibility to attach to Seller for late arrival of Documents, negligence excepted. No Seller shall be responsible for charges at destination provided First Seller has passed out his Final Declaration in London before arrival of Vessel, and such Declaration has been duly passed on according to Condition 14. Should charges arise from splitting of Documents the responsibility for such Charges shall rest on the party requiring the Documents to be split. Documents for Buyer's account, ship lost or not lost.

FREIGHT.—Freight must be prepaid at time to shipment unless the ship refuses to accept same.

Whenever freight is payable at destination and the rate is set out in Bill of Lading in American currency, Seller must provide a Banker's sight draft in gold dollars payable to Seller's or Shipper's order and endorsed in blank for the amount of freight which must be attached to Documents.

When freight is payable at destination and is set out in Bill of Lading at a rate otherwise than in American currency, but is made payable in such currency, Seller must deduct the amount of freight as per Bill of Lading from his Invoice and reimburse to Buyer any loss arising out of any difference in exchange between the day on which documents are paid for in London and the day freight is paid at destination. Any claim for such loss shall be accompanied by freight account, and must be presented in London within one month of date of payment of freight at destination.

THE C.I.F. RUBBER CONTRACT

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ARBITRATION.—Any dispute arising out of this Contract shall be settled by Arbitration in London, according to the Regulations and By-Laws of the Rubber Trade Association of London.

Brokerage per cent, ship lost or not lost.

— & Co.,
BROKERS.

Tear off slip

RECEIVED from

& Co.,

Purchase Contract dated

192 for

tons Standard Quality

Sale

Plantation Rubber for shipment

(a)

per lb.

c.i.f.

which we hereby confirm.

192

[REVERSE OF CONTRACT FORM]

CONDITIONS APPLYING TO THIS CONTRACT

1. When rubber is sold for monthly shipment, each month's or specified part of a month's shipment to be treated as a separate Contract.
2. The Broker signing this Contract guarantees the solvency of his Principals during the continuance thereof, unless otherwise specified in the Contract.
3. Whenever it may be declared by the First Seller, or decided by Arbitration, that he has failed to fulfil the terms of his Contract, the Rubber shall be invoiced back to him at a price and weight to be fixed by Arbitration, which price shall be the estimated market value of the Rubber contracted for on the day upon which default occurs, plus a penalty of not less than 1d. (one penny) per lb.
4. In the event of there being more than one Contract subsisting between the same parties, which shall be closed in pursuance of Clause 12 of the General Regulations Relating to the Constitution of the Rubber Trade Association of London, an account shall be taken of what is due from the one party to the other in respect of such Contracts, and the sum due from the one party shall be set off against the sum due from the other party, and the balance of the account; and no more shall be claimed and paid on either side respectively.
5. When the subject matter and terms of the Contracts are identical, or identical except as to date, quantity or price, all arbitrations shall be held as between First Seller and Last Buyer as though they were the only contracting parties (notwithstanding any provision to the contrary contained in the Arbitration Act, 1889), and the Award made in pursuance thereof, subject to the right of appeal to the Association, shall be binding on all intermediate parties.
6. Unless Arbitrators otherwise direct, all differences due under any Arbitration Award whether arising out of claims for default, or claims on quality, or otherwise, shall be paid in cash in London within 7 days from the date of the Award. Payment may be suspended in the event of an appeal, but the amount shall then be increased by interest at Bank Rate.

7. Should either Seller or Buyer be prevented from fulfilling this contract, during the period stipulated therein, by reason of riots, strikes, lock-outs, combinations of workmen, or *force majeure*, the time for fulfilment shall be extended until the operation of the causes preventing same has ceased.

8. Any notice to be given under this Contract other than those required by Conditions 13, 14, 15 and 16 may be delivered personally or left at, or posted to the last known place of business of the party to whom it is addressed, and all correspondence shall be passed on with due despatch.

9. When an act has to be done on or before a given day, and such day shall happen to be a non-business day (which shall include any day declared as such by the Rubber Trade Association of London), such act must be done on or before the next following business day, unless provision is made to the contrary in these Conditions. Bank Holidays, Christmas Day, Good Friday and Sundays, shall not be considered business days.

10. In these Conditions, unless the context otherwise requires, words importing the singular number only shall include the plural number, and words importing the plural number only shall include the singular number, and words importing persons shall include firms and corporations.

11. The expressions "about" and "more or less" when used to define quantities contracted for, shall mean that no excess or deficiency shall be greater than 1 per cent of the Contract quantity or any monthly portion thereof, for Contracts of five tons or over, nor than 100 lb. for Contracts of less than five tons. The word "ton" shall mean a ton of 2,240 lb.

12. Any slight variation in marks (other than quality marks), numbers or ship's names, shall not vitiate this Contract.

13. PROVISIONAL DECLARATION.—First Seller must obtain prompt advice by cable of all shipments effected against his Contracts. Such advice shall state quantity shipped, name of steamer, and month in which Bill of Lading is dated. On receipt of such advice First Seller, or his Broker, shall make a Provisional Declaration on the official (pink) form issued by the Association. Provisional Declarations shall be passed on with due despatch, and in any case within 24 hours of receipt. Provisional Declarations received after 4 p.m. on Friday may be passed on at any time up to 11 a.m. on the following Monday. Omission to give or delay in making Provisional Declaration entitles Buyer to claim damages, but not default. A Buyer who has retained a Provisional Declaration for more than the time stated in this Condition shall be considered last Buyer, and on any resale of Rubber for which he has received already a Provisional Declaration, he shall become First Seller, and the Contract shall state :—

"Already provisionally declared per s/s....."

"Bill of Lading, dated the month of....."

"First Selling Broker.....Reference....."

Without the consent of Buyer no Provisional Declarations shall be withdrawn or altered except in the case of a *bona-fide* error, of which Seller shall furnish adequate proof.

14. DECLARATION OF DOCUMENTS.—Declaration that documents are ready for delivery shall be made on the official (green) form issued by the Rubber Trade Association of London, and shall contain sufficient particulars as to net weight, freight, etc., to enable invoices to be prepared. Such declaration shall be made by First Seller without delay and by First Selling Broker to his Buyer not later than 12 o'clock noon and First Seller shall put his Broker in possession of the particulars by 11 a.m. to enable this to be done. Declarations shall be passed on to subsequent Buyers with due despatch, and in any case within one

hour of receipt. Declarations received between 1 and 2 p.m. must be received by the next Buyer before 3 p.m. Declarations reaching First Selling Broker after 11 a.m. shall be counted as having been started on the next following business day, but must in every case be passed on with due despatch as above. Any party holding up Final Declaration beyond the stipulated period shall render himself liable to a penalty to be fixed by Arbitration. The First Selling Broker and each subsequent Buyer or Broker shall render invoice to his Buyer within 24 hours of passing on declaration. Any Buyer splitting final declarations shall become Last Buyer and First Seller.

15. INSPECTION OF DOCUMENTS.—On final declaration reaching Last Buyer he shall complete and forward to First Selling Broker with due despatch the special counterfoil provided for the Last Buyer on the Declaration Form, and inspect within 24 hours from the time when Documents are ready for this purpose. Delay or non-fulfilment of this Condition renders Last Buyer liable to a penalty to be fixed by Arbitration. On receipt of the counterfoil First Selling Broker shall permit Buyer to inspect the Documents. In the event of Documents not being in First Selling Broker's possession, the First Selling Broker shall arrange a time within 24 hours for Last Buyer to inspect the Documents at First Selling Broker's Office. Within two hours of inspection of Documents Last Buyer shall deliver to First Selling Broker either :—

(1) A memorandum in the form laid down by the Association that he has inspected the Documents and that same are in order.

or (2) Notice in writing specifying any objection to the validity of the Documents.

In the event (2) First Selling Broker shall take the necessary steps to remove Buyer's objection and obtain memorandum of approval.

16. PAYMENT.—Last Buyer's memorandum stating that he has inspected and approved the Documents, shall be attached by First Selling Broker to the Documents, which shall be tendered to First Buyer on the fifth business day after date of Final Declaration, unless Last Buyer shall have acquired earlier delivery of Documents and shall have applied to First Selling Broker, in which case First Selling Broker shall pass on Documents at once with Last Buyer's application attached. No interest shall be allowed to any Buyer in respect of Documents taken up under this rule. Documents must be passed on with due despatch, cash against delivery. Sellers shall not be entitled to tender Documents to next Buyer and claim payment under this clause after 2 p.m. from Brokers nor after 2.15 p.m. from Merchants.

For the purpose of Conditions Nos. 15 and 16 Saturday shall not be considered a business day.

The hours of a business day are from 10 a.m. to 5 p.m., Saturday 10 a.m. to 12 noon.

In all cases a Banker's guarantee must be issued by a Banker established in the United Kingdom.

WAREHOUSE TO WAREHOUSE CLAUSE REFERRED TO ON FACE OF CONTRACT :—The insured goods are covered subject to the terms of this Policy from the time of leaving Shippers' or Manufacturers' warehouse during the ordinary course of transit until on board the vessel, during transhipment if any, and from the vessel whilst on quays, wharves or sheds during the ordinary course of transit until safely deposited in consignees' or other warehouse at destination named in Policy.

NOTE.—Approved Samplers in New York are :—

Messrs. W. H. Brooks; R. S. Case; Core & Herbert; Doane & Bros.; Thos. A. Finnerty & Co.; J. D. Fowler; Hair & Gates; L. C. Hopkins; Meldowney & Martin; Nostrand & Rademaker; Chas. C. Perpell; Pickford's Colonial Inc.; William Vyse.

The Committee shall be at liberty to vary this list from time to time.

APPENDIX II

LISTS OF COMMERCIAL FIRMS INTERESTED IN THE RUBBER, TEA, COFFEE, CACAO, SPICE AND TOBACCO INDUSTRIES AS EXPORTERS, IMPORTERS, BROKERS, ETC.

THE Publishers convey a general invitation to Secretaries of Trade Associations to furnish lists additional to those given below for publication in later editions of this book. All lists should be properly authenticated. Such inadequacies as the present lists reveal are incidental to the production of the first edition of what it is hoped will come to be regarded as a standard work of reference.

THE RUBBER TRADE ASSOCIATION OF LONDON

6 MINCING LANE, E.C. 3.

MEMBERS

Class "A" Producers (Individual Estates omitted)

ADAMSON, GILFILLAN & Co., LTD.	DODWELL & Co., LTD.
AFRICAN & EASTERN TRADE CORPORATION, LTD.	JOHN K. GILLIAT & Co., LTD.
J. M. ALLINSON.	GUTHRIE & Co., LTD.
C. J. ANDREWS.	HARRISONS & CROSFIELD, LTD.
ARNOLD & MURRAY.	SYDNEY HARVEY & Co., LTD.
SIR JOHN BARLOW, BART.	LESLIE & ANDERSON.
L. T. BOUSTEAD.	LYALL, ANDERSON & Co.
ED. BOUSTEAD & Co.	PATERSON, SIMONS & Co., LTD.
BRIGHT & GALBRAITH, LTD.	ROWLEY, DAVIES & Co., LTD.
BRINKMANN & Co.	RUBBER ESTATE AGENCY, LTD.
P. R. BUCHANAN & Co.	SHAND, HALDANE & Co.
JOHN BUTTERY & Co.	SHARPE, ESTALL & Co., LTD.
DARRAGH, SMAIL & Co., LTD.	VOLKART BROS.
DICKSON, ANDERSON & Co.	WALLACE BROS. & Co., LTD.
	G. A. WITT'S SUCCESSOR, J. BLUM,

Class "B" Brokers

J. F. ADAIR & Co.	HAW & Co.
A. T. BARCLAY & Co.	CHARLES HOPE & SON.
F. W. BOWYER & BARTLEET.	HYMANS, KRAAY & Co.
W. BROADHURST & Co.	H. W. JEWESBURY & Co.
C. CZARNIKOW, LTD.	JONES & DARKE, LTD.
S. FIGGIS & Co.	JONES & FALL.
FRENCH & PLUCKNETT.	LANE MITCHELL, LTD.
GOW, WILSON & STANTON, LTD.	LEWIS & PEAT, LTD.
GRISARS, LTD.	LLOYD, MATHESON & CARRITT.
HALE & SON.	D. McNAUGHT & Co.

O. PHILIPPSON.
 PRICE, HICKMAN & Co.
 J. H. RAYNER & Co.
 ROLLS & SON.
 HENRY ROOKE, SONS & Co.
 R. J. ROUSE & Co., LTD.
 I. A. RUCKER & BENCRAFT.
 SANDERSON & Co.

F. E. SMITH & Co.
 SYMINGTON & SINCLAIR.
 W. J. & H. THOMPSON.
 EDWARD TILL & Co., LTD.
 A. TOOLEY & Co.
 FRANCIS WELBY & Co.
 GEO. WHITE & Co.
 WILSON SMITHETT & Co.

Class "C" Dealers

ALDENS' SUCCESSORS, LTD.
 BALATA, LIMITED.
 BEAHAN & SAINSBURY.
 A. BENDIXSEN & Co., LTD.
 BOKS & Co.
 BRONNER, MUSSETT & Co.
 BUNTING & Co., LTD.
 CHAUTARD & Co., LTD.
 HARVEY CHRISTIE-MILLER & Co.
 T. H. COOKSON & Co.
 CORRIE, MACCOIL & SON, LTD.
 JAMES DOUGLAS & Co.
 FAULKNER & WINSOR.
 HENRY GARDNER & Co., LTD.
 GENERAL RUBBER Co., LTD.
 GRACE BROTHERS & Co., LTD.
 HACOBIAN BROS. & Co.
 GEO. HANKIN & Co.
 HECHT, LEVIS & KAHN.
 HEILBUT, SYMONS & Co., LTD.
 HENDERSON, FORBES & Co., LTD.
 C. HIRCH & Co.
 JAEGER & Co.
 E. W. JONES & Co.
 ROBERT KATZ & Co.

OSWALD LATHAM & Co.
 LEWIS LAZARUS & SONS.
 LEWISOHN BROS.
 MACADAM, REITH & Co.
 MARSHALL, WOOLF & Co.
 MITSUBISHI SHOJI KAISHA, LTD.
 MITSUI & Co., LTD.
 NETHERLAND CORPORATION FOR OVERSEA
 TRADE, LTD.
 OSTERRIETH & Co., LTD.
 FRANCIS PEEK & Co., LTD.
 W. G. PRATT & Co., LTD.
 ROSS, PENTREATH & Co.
 RUBBER PRODUCTS, LTD.
 A. RUNGE & Co.
 W. T. SARGANT & SONS.
 J. SAUNDERS & Co.
 EDM. SCHLUTER & Co.
 ALFRED STERN.
 SUZUKI & Co.
 THORNETT & FEHR.
 UNITED BALTIC CORPORATION, LTD.
 S. N. WHITEHEAD.
 WILSON, HOLGATE & Co., LTD.

SINGAPORE CHAMBER OF COMMERCE RUBBER ASSOCIATION (CHARTERED BANK CHAMBERS, SINGAPORE)

LIST OF MEMBERS, ASSOCIATE MEMBERS, AND PERMIT HOLDERS
 as at 1st October, 1923

MEMBERS

(All of Singapore)

Dealers :

ADAMSON, GILFILLAN & Co., LTD.
 ALDENS' SUCCESSORS (Eastern) LTD.
 ANGLO-FRENCH TRADING Co., LTD.
 BENDIXSEN & Co., LTD., H.
 BOASSON & VAN OVERZEE.

BORNEO SUMATRA TRADING Co., LTD.
 BRINKMANN & Co.
 EAST ASIATIC Co., LTD.
 EASTERN RUBBER Co., LTD.
 FRASER & CUMMING.

GORDON & Co., LTD.
 GRAHAM & Co., F. H.
 HENDERSON BROS., LTD.
 HUTTENBACH LAZARUS & SONS, LTD.
 JAEGER & Co.
 KATZ BROTHERS, LTD.
 LOXLEY & Co., W. R.
 McALISTER & Co., LTD.
 MEYER, MEASOR & BURKILL, LTD.

MILLAR & Co., LTD., W. P.
 MITSUI BUSSAN KAISHA, LTD.
 NETHERLANDS GUTTA-PERCHA Co.
 PATERSON, SIMONS & Co., LTD.
 PEEK & Co., LTD., FRANCIS.
 THORNETT & FEHR (Singapore), LTD.
 WATERHOUSE Co., LTD., FRED.
 WESSELINK & DIJKHUIS, LTD.
 WILSON, HOLGATE & Co. (F.E.), LTD.

Selling Agents :

ANGLO-SIAM CORPORATION, LTD.
 BARLOW & Co.
 BORNEO Co., LTD.
 BOUSTEAD & Co., LTD.
 BRUCE PETRIE, LTD.
 DERRICK & Co.

GUTHRIE & Co., LTD.
 HARRISON, BARKER & Co., LTD.
 HOOGLANDT & Co.
 SANDILANDS, BUTTERY & Co.
 SIME, DARBY & Co., LTD.

Manufacturers' Buyers :

DAGGETT & Co. (Inc.), H. A.
 DUNLOP RUBBER Co. (S. S.), LTD.
 FIRESTONE TIRE & RUBBER Co. (S.S.),
 LTD.

FISK RUBBER Co. (F.E.), LTD.
 GENERAL RUBBER Co.
 ORIENT Co., LTD.
 PIRELLI (F.E.), LTD.

Brokers :

CARMICHAEL & Co.
 DUPIRE BROTHERS.
 HUBBACK & SMITH.
 LEWIS & PEAT, LTD.

LYALL & RIERA.
 MACPHAIL & Co., LTD.
 QUINTON LAW & Co.
 STANTON NELSON & Co., LTD.

Associate Members :

BAN HONG & Co., LTD.
 CHEONG JOO & Co.
 CHEW LAI HOE.
 CHIN GUAN HENG & Co.
 CHIN SENG & Co.
 CHIN WAH & Co.
 EE GUAN.
 ENG GEOK & Co.
 HIN LIM & Co.
 KATOH & Co., LTD.
 KAWAHARA & Co., LTD.
 KIM HOE & Co., LTD.
 LAM CHOON & Co.

LOW YONG NGIAP & Co.
 MITSUBISHI SHIOJI KAISHA, LTD.
 NICHIRAN TRADING Co., LTD.
 OTOMUNE & Co., LTD.
 SENDA & Co., LTD.
 SIN SENG.
 SUZUKI & Co., LTD.
 TAN CHWEE PANG.
 TAN KAH KEE & Co.
 THIO SOEN YANG.
 THYE HIN & Co.
 WAH HONG SENG KEE.

Permit Holders :

BAN HIN LEE.
 CHIAT HONG & Co.
 CHUAN CHEW & Co.

NEESON & SONS, LTD.
 SCHMID SCHUDEL & Co.

TEA BUYERS' ASSOCIATION

(1 Oxford Court, Cannon Street, London, E.C. 4.)

LIST OF MEMBERS

ABSOLOM, CRÖCKER & Co., LTD., 23 Rood Lane, E.C. 3.
 AERATED BREAD Co., LTD., 21 Camden Road, N.W. 1.
 MATTHEW ALGIE & Co., 58 Cadogan Street, Glasgow.
 ANDERSON & MONTGOMERY, 49 York Place, Edinburgh.
 ANGLO-ASIATIC Co., LTD., 41 Eastcheap, E.C. 3.
 APPLETON, MACHIN & SMILES, LTD., 14 College Hill, E.C. 4.
 JOSEPH ARMITAGE, SON & Co., LTD., 5 Minories, E. 1.
 JAMES ASHBY & SONS, 7 Idol Lane, E.C. 3.
 ASSOCIATED LONDON TEA MARKETS, LTD., 9-10 St. Mary-at-Hill, E.C. 3.
 BAKER, WARDELL & Co., LTD.
 T. BASS & SONS, 5 Colonial Avenue, Minories, E. 1.
 J. & I. BATTEN & Co., 24 Rood Lane, E.C. 3.
 R. BEAZLEY & Co., St. Dunstan's House, Idol Lane, E.C. 3.
 BETTS, HARTLEY & Co., 9 Great Tower Street, E.C. 3.
 BLACK & GREEN, LTD., 19 Cousin Lane, E.C. 4.
 BRASH BROS., 23 Rood Lane, E.C. 3.
 BRITISH & BENINGTON'S, LTD., 118 Southwark Street, S.E. 1.
 BRODIE, WILLIAMS & BOYES, LTD., 19 Cousin Lane, E.C. 4.
 BROOKE, BOND & Co., LTD., Goulston Street, E. 1.
 BROWNE, ROSENHEIM, ROSS & ROSENHEIM, 59 Mark Lane, E.C. 3.
 H. H. & S. BUDGETT & Co., LTD., York Street, Swansea.
 SAMUEL BUDGETT & Co., LTD., 24 Great Tower Street, E.C. 3.
 BURBRIDGE, PRITCHARD & BARTLEET, 16 Philpot Lane, E.C. 3.
 JOSEPH BURTON & SONS, LTD., Talbot Street, Nottingham.
 CIVIL SERVICE SUPPLY ASSOCIATION, LTD., 136 Queen Victoria Street, E.C. 4.
 THOS. CLARKE & Co., 40 King William Street, E.C. 4.
 COMPTON & Co., 12 Water Lane, E.C. 3.
 COPPEN BROS., LTD., 155 Lambeth Walk, S.E. 11.
 GEO. T. COX & SONS, LTD., 31 King William Street, E.C. 4.
 CROSS, SONS & ABSOLOM, LTD., 38 Fenchurch Street, E.C. 3.
 CUBITT, GAZE & Co., 10 Northumberland Alley, E.C. 3.
 W. H. CULLEN, 32 East Street, E.C. 2.
 RICHARD DICKESON & Co., LTD., 57 Charterhouse Street, E. 1.
 DOBBIN, OGILVIE & Co., LTD., King Street, Cork.
 ELLIS, DAVIES & Co., 16 Mincing Lane, E.C. 3.
 EMPIRE TEA Co., LTD., 88 Old Street, E.C. 1.
 THE ENGLISH & SCOTTISH CO-OPERATIVE WHOLESALE SOCIETY, Lemon Street, E. 1.
 FERGUSON, HOLNESS & Co., LTD., Oxford House, American Square, E.C. 3.
 FINCHAM, MATSON & Co., St. Dunstan's House, E.C. 3.
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